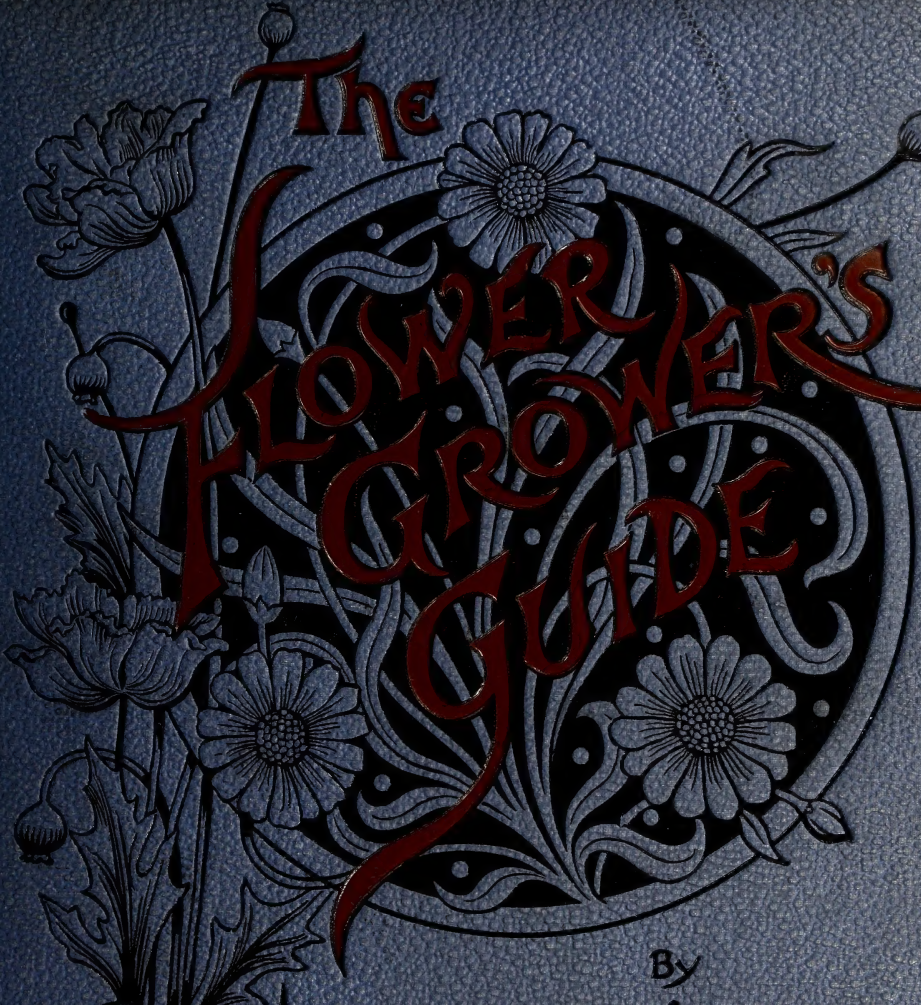
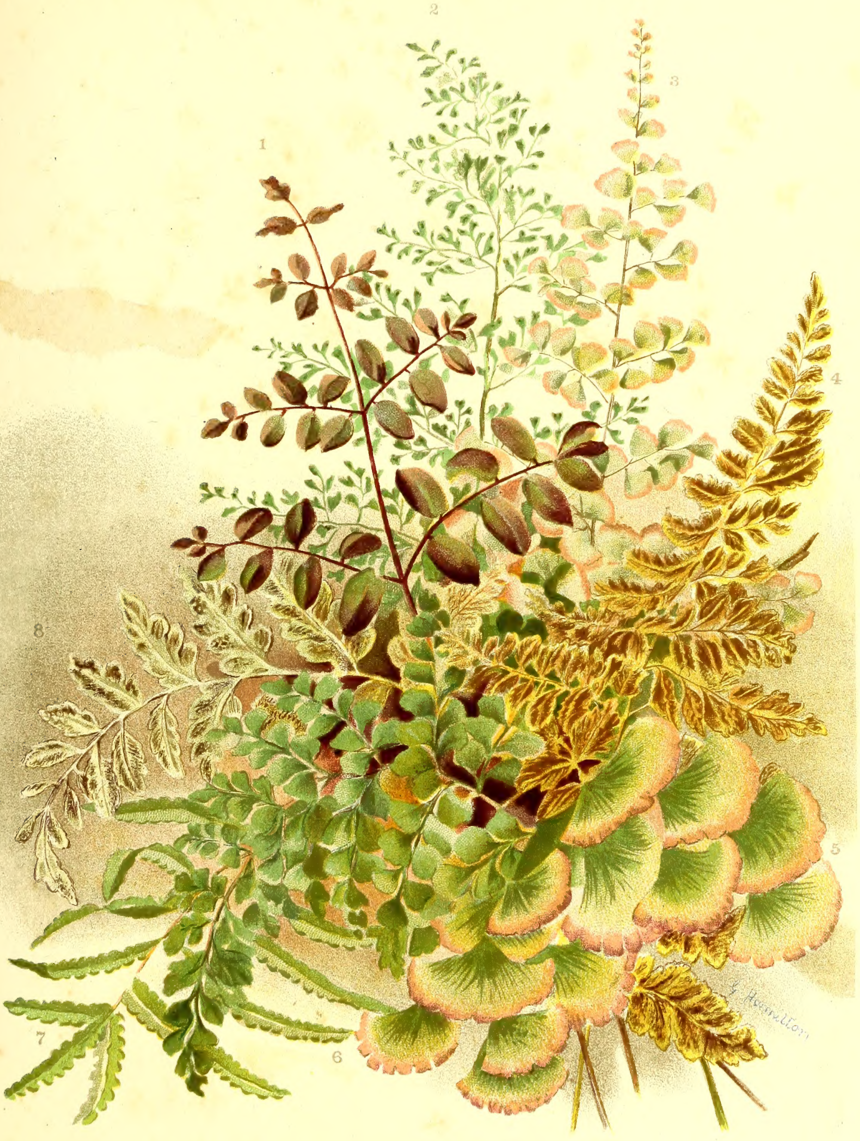


The Flower Grower's Guide

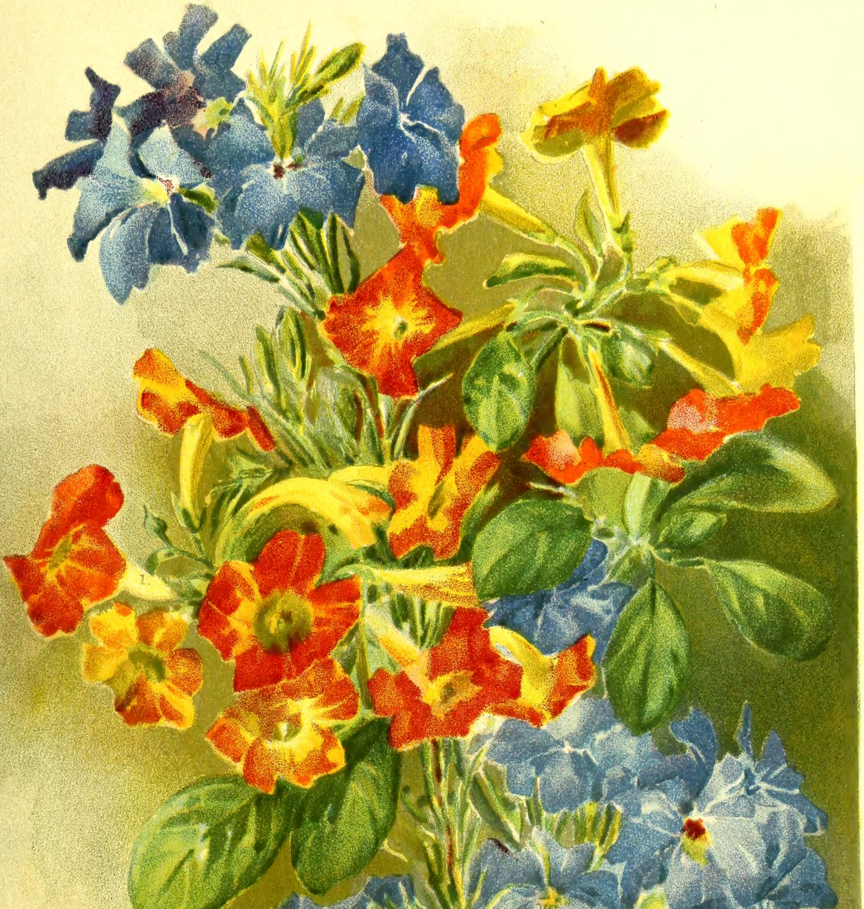
By

JOHN WRIGHT

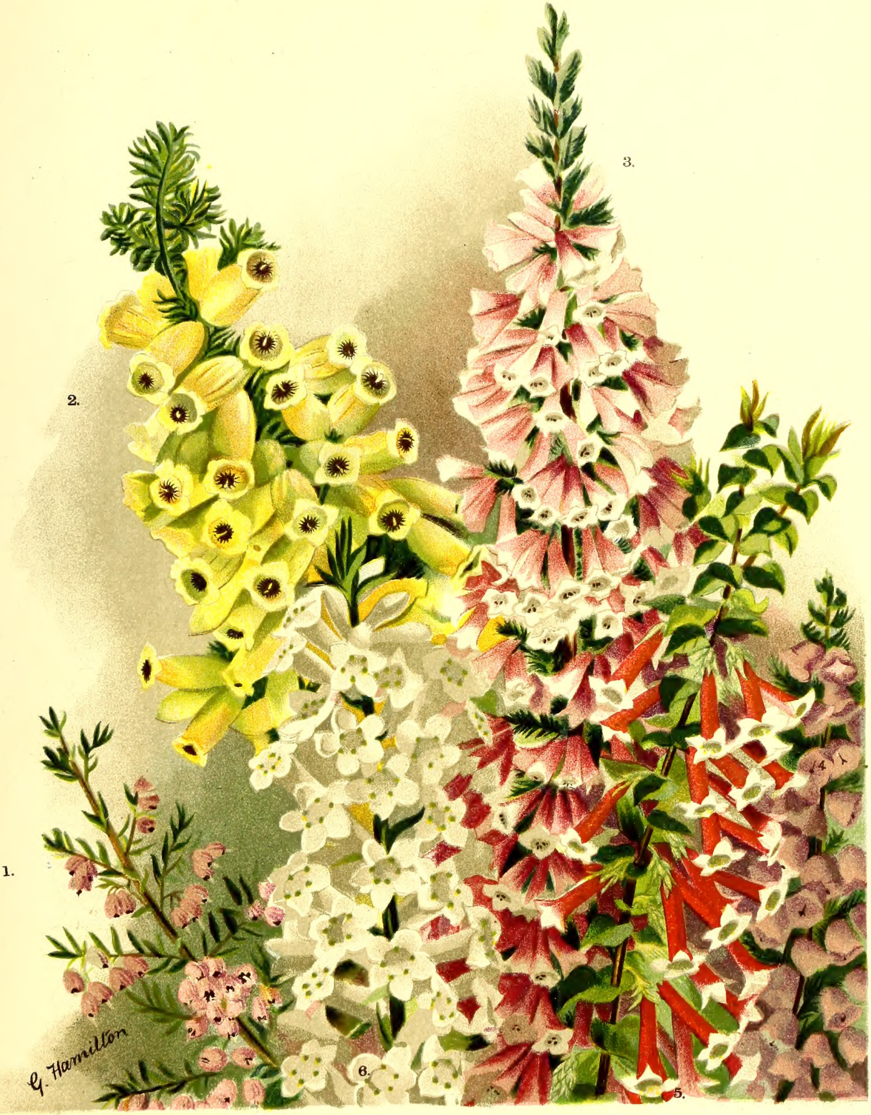


FERNS.

1. Osmunda palustris. 2. Davallia Veitchiana. 3. Adiantum rubellum. 4. Gymnogramma chrysophylla.
5. Adiantum Farleyense. 6. Davallia retusa. 7. Gleichenia Speluncæ. 8. Gymnogramma peruviana.

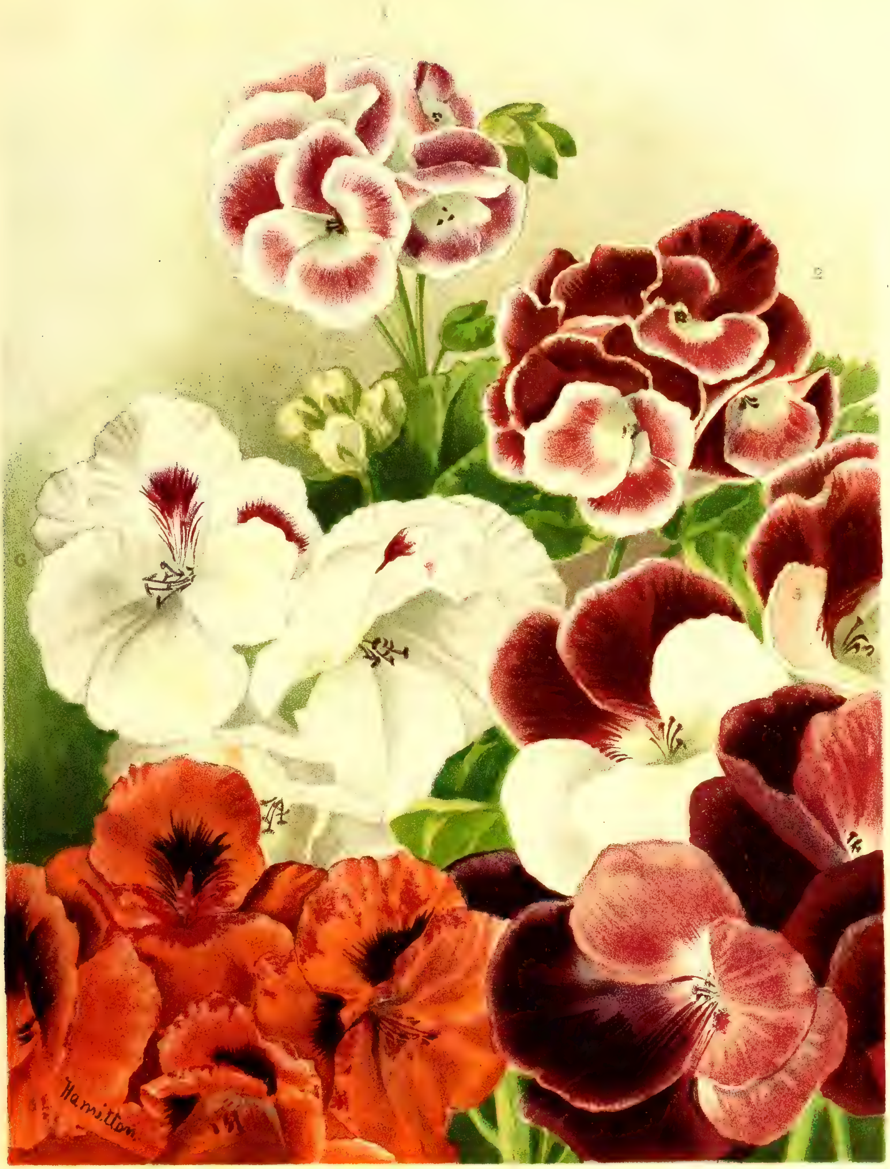


1. STREPTOSOLON JAMESONI. 2. LESCHENAULTIA BILOBA MAJOR.



ERICAS AND EPACRISES.

1. Erica melanthera. 2. E. Cavendishiana. 3. E. hyemalis superba. 4. E. propendens. 5. Epacris miniata.
6. E. hyacinthiflora alba.



FANCY, SHOW, AND DECORATIVE PELARGONIUMS.

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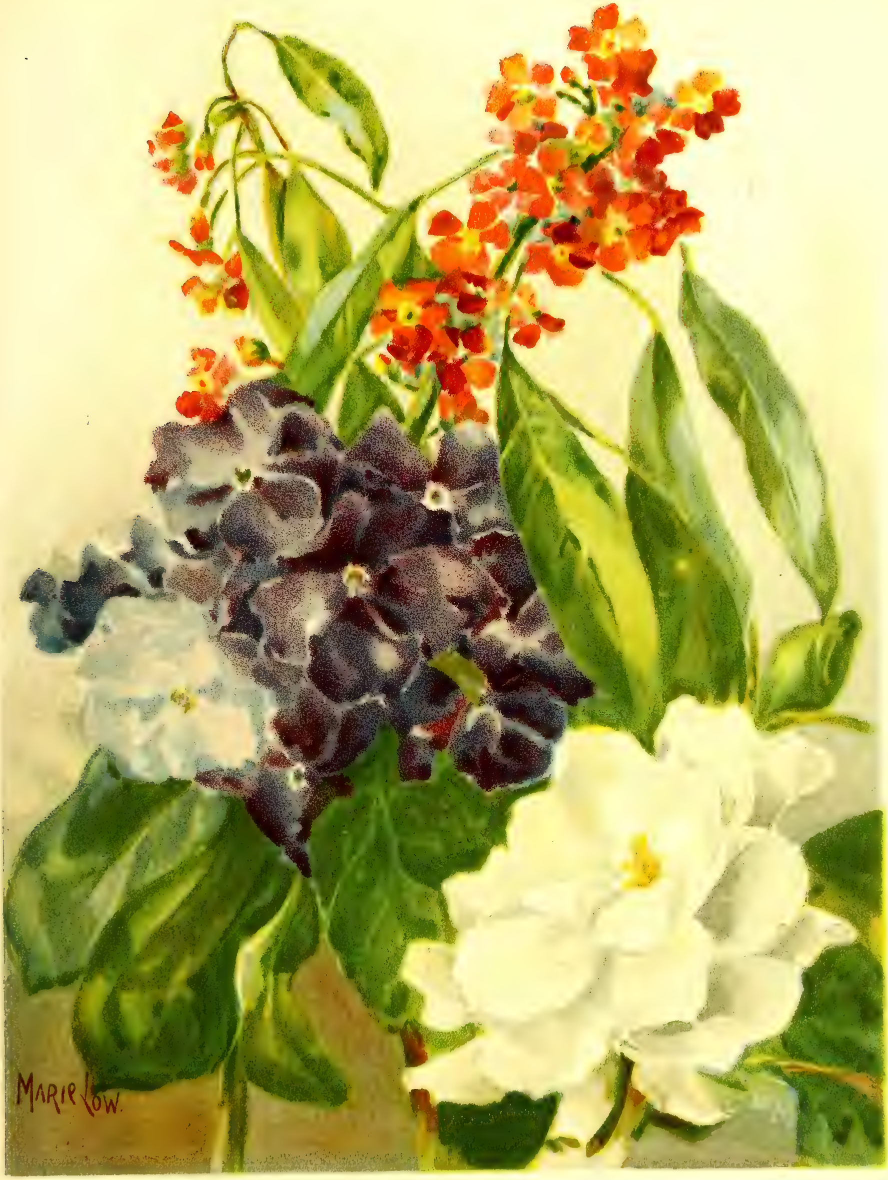
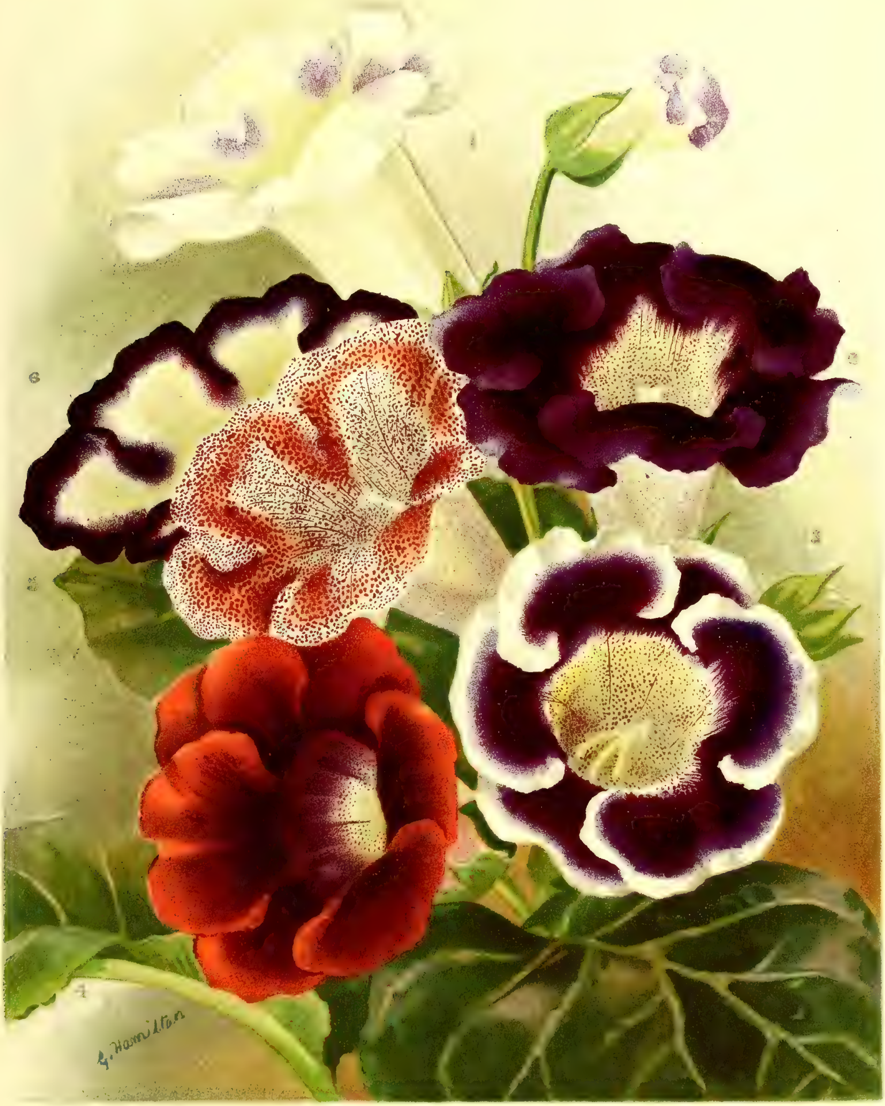


1. FRANCISCEA GRANDIFLORA. 2. EUPHORBIA JACQUENIÆFLORA (FULGENS)
3. GARDENIA INTERMEDIA.



GLOXINIAS

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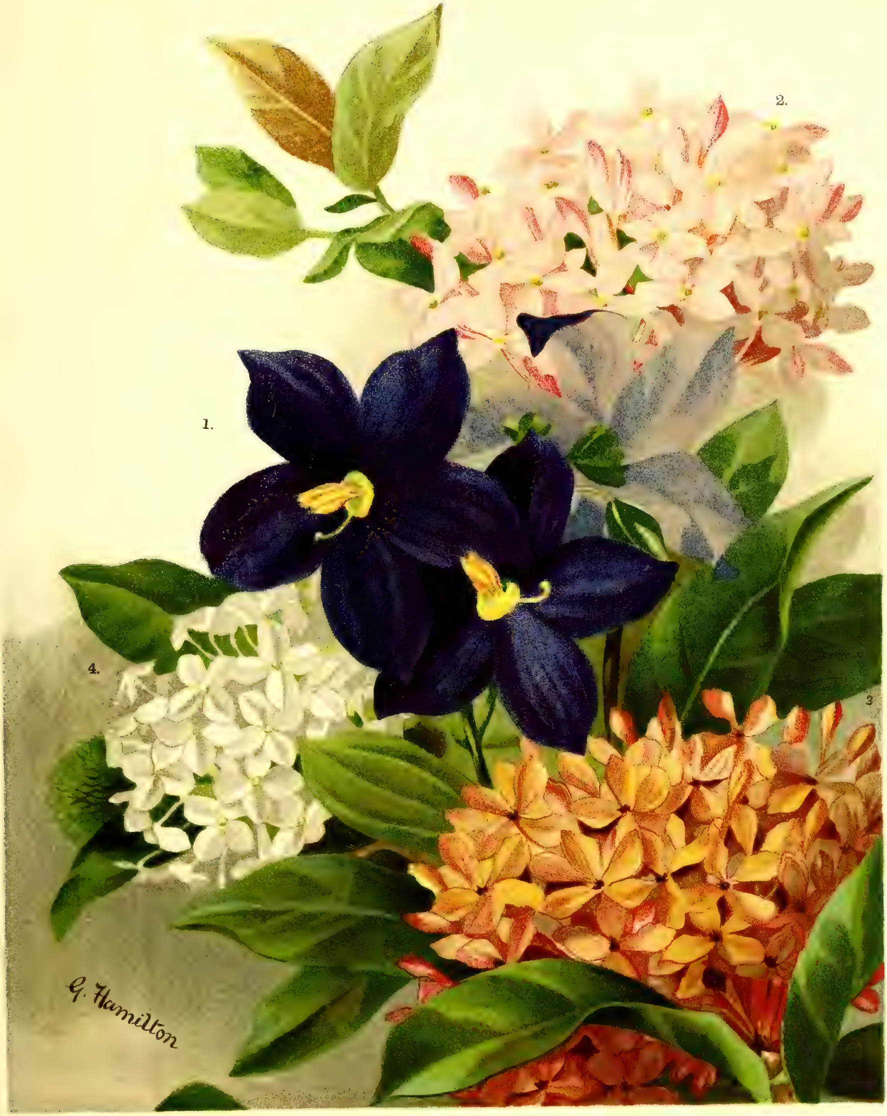

EXACUM AND IXORAS

1. Exacum macranthum. 2. Ixora Fraseri. 3. I. Westii. 4. I. Colei.

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THE
FLOWER GROWER'S GUIDE

BY

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AUTHOR OF "PRIMER ON HORTICULTURE," "GARDEN FLOWERS AND PLANTS"
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ETC., ETC.

With Coloured Illustrations

BY MISS GERTRUDE HAMILTON AND MISS MARIE LOW

AND

NUMEROUS ILLUSTRATIVE DIAGRAMS BY F. W. BURBIDGE, F.L.S., GEORGE SHAYLER, F.R.H.S.,
AND MISS MAY IGGULDEN.

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moss and sand, surfacing over with short green tips of sphagnum. On this damp moss sow the seed, stand the pots in pans of water, cover each with a bell-glass, and place in a cool shady corner in a greenhouse. If the pans are kept filled with water the moss will be constantly moist, and the seed ought to germinate in six weeks. Prick off the seedlings in pans filled with a compost similar to that used in the seed pans; strong plants may also be increased by division. Darlingtonias are best grown under a hand-light or in a glazed case in a shady position in the greenhouse. Give abundance of water and ventilate daily. For strong plants use a mixture of equal parts of peat, chopped sphagnum, sharp sand, and small pieces of limestone.

DARWINIA.—For all practical purposes this genus of hard-wooded, Australian plants might well be included with the genetyllis or hedaromas. The species sometimes classed as darwinias are D. fimbriata (syn. Genetyllis fimbriata), D. fuchsiodes (syn. Genetyllis fuchsioides), D. macrostegia (syn. Hedaroma or Genetyllis tulipefera) and D. purpurea (syn. Genetyllis purpurea). Propagated by cuttings of young shoots under bell-glass in greenhouse. Pot off singly into thumb-pots, and grow on greenhouse shelf. Top to make them bushy. Gradually shift into larger pots, using a mixture of equal parts of loam, peat and sand. Other treatment similar to Ericas.

DASYLIRION.—For exhibition purposes the dasylirion ranks high, and is also well adapted for conservatory adornment. They are greenhouse evergreens, with a short stout stem, and a mass of long semi-erect leaves which assume a graceful form, and are very durable. The species in cultivation are D. acrotrichum, D. glaucophyllum, D. g. latifolium, D. longifolium, and D. serratifolium. They are raised from seeds sown in March or April, in well-drained pots filled with sandy peat and covered with glass, in a temperature of 50° to 60°. From small pots gradually shift the plants into larger sizes, using a compost of two parts loam to one of peat, with sharp sand added. Drain thoroughly and pot firmly. When the soil is well occupied by roots, abundance of water must be supplied, especially during the hottest part of the year. They may be arranged in the open during the summer, and should be wintered in a temperature ranging from 45° to 55°.

DIONÆA.—D. muscipula, Venus' Fly-trap, is a native of Carolina and Florida, and is a diminutive as well as most interesting "carnivorous" plant. The leaves, borne on comparatively long footstalks, "are dilated at the top into two, or a two-lobed irritable limb, beset with a row of long hairs on the margin, folding together in the manner of the teeth of a trap." The seat of irritation resides in the bristles in the centre of each lobe. On these being touched, say by a fly, movement at once takes place and the insect is caught, held, and absorbed. Dionæa are raised from seed similarly to darlingtonia (which see), and also by division in March or April. Use well-drained pots, and equal parts of chopped living sphagnum, peat, and potsherds. Set the pots containing the plants in pans, kept constantly filled with water, near to the glass in either a greenhouse or frame.

DIOSMA.—This genus from South Africa is remarkable for the fragrance of the very small leaves when slightly rubbed or bruised, and for this principally two species are cultivated, namely, D. ericoides and D. vulgaris (syn. D. gracilis). Both attain a height of from 1 foot to 3 feet. Diosmas are easily propagated. From March till June cuttings may be inserted in sandy peat, under a bell-glass and rooted in a temperature of 55° to 60°. Place the young plants singly in thumb pots and arrange on greenhouse shelves. Top to make them bushy, and gradually shift into larger pots, using a mixture of two parts fibrous peat to one of loam, adding sharp sand and potting firmly. Avoid over-watering in the winter.

DIPLACUS.—This may be briefly described as a woody species of mimulus. The original is D. glutinosus, a branching shrub from California, and well worthy of general cultivation. It has glutinous or sticky leaves, and is almost continuous in flowering. Colour buff or salmon. From this species hybrids have been raised of much the same character, and there is also an orange-red form, D. g. puniceus. Propagation is effected by cuttings of young shoots 2 inches long, inserted in sandy peat, and covered with glass, in a temperature of about 65°. Young plants should be placed singly in 2½-inch pots, and given a good start in gentle heat. Gradually shift into larger sizes, using a compost of two parts fibrous loam to one part of leaf soil, adding fine, well-decayed manure and sand. Stake, and allow the plants to branch naturally, or train the growths loosely over a light balloon-shaped trellis. Prune freely in February, and re-pot when fresh growth commences. Diplacus can be grown in a cool airy greenhouse all the year round, but the plants may be stood in the open air after flowering till the autumn.

DRACOPHYLLUM.—D. gracile from West Australia must be included among those greenhouse plants which are not often met with nowadays, owing to their being of comparatively slow growth and difficult to cultivate. Well grown and properly trained into a neat globular head with the aid of a few neat green painted sticks and strong thread, D. gracile carries weight as an early summer exhibition plant. It is of a loose habit of growth, producing neat terminal heads of pure white flowers. Cuttings from the tips of young shoots taken off any time from September to April, inserted in sand, covered with a bell-glass, placed in a temperature of 60° to 65°, and kept uniformly moist, will eventually produce roots. The young plants must be placed singly in thumb pots, and grown on a greenhouse shelf. Top to promote branching. Only small shifts should be given, and each time clean, well-drained pots and sandy peat must be used. Pot firmly and water carefully, never allowing the soil to become very dry, as this would mean the loss of numerous fibrous roots and probably the early death of the plant.

DROSERA (Sundew).—The Droseras are good companions for Dionæa muscipula. In common with these they are diminutive yet most interesting plants, and classed as insectivorous, the tiny hairy leaves with dewdrops of viscid fluid at their points closing on and retaining any small insects that venture on them and set up the requisite irritation. Drosera can be raised from seed as advised in the case of darlingtonia (see page 176); also by portions of strong roots cut into ½-inch to inch lengths, and laid on the surface of sandy soil in a shallow pan and covered with ½ inch of the same kind of soil, in pans in a moist, well-heated house or frame, and kept steadily moist. The after culture is practically the same as dionæa, which see. The species of drosera recommended for greenhouse culture are:—D. binata (syn. D. dichotoma), Australia; leaves on long footstalks, and two-lobed; flowers pure white; it is the most extensively cultivated. D. capensis, Cape of Good Hope, of closer growth than the preceding; flowers purple. And D. spathulata, Australia, dwarf; flowers purple. All three species are perennials.

EPACRIS.

In bygone years collections of epacrises were more frequently seen than now. At their best they are beautiful objects, and well repay for all the trouble taken in producing them. During the first two or three years progress is slow, the start being usually made with plants purchased from a nurseryman, and that is undoubtedly the best plan. They are propagated by cuttings formed of the ends of young shoots in August or April. Insert these in pots of sandy peat, surfaced with sand and watered, fixing them well, cover with a bell-glass and place in a greenhouse. When rooted, pot singly, keep the plants close for a time till growing freely, then assign them a more airy position, and eventually grow them on a base of ashes in a frame. As the plants grow top the shoots and give small shifts to larger pots as required, making the soil quite firm.

Strong plants ought to be pruned soon after flowering, the erect-growing varieties rather closely, but not below the leaves; those of a more pendulous character having their growths shortened to about half their length only. The cultivator's aim should be to obtain as many strong early growths as possible with a view to having these thoroughly ripened by the autumn for producing an abundance of flowers in the winter or spring. When young shoots are beginning to form, the time has arrived for examining the state of the soil and roots. If the drainage is free, the soil sweet, and roots not crowded, the plants will go another season without being re-potted. Those found with their draingauge clogged and soil soured, owing probably to the presence of worms, should have the crocks removed, much of the sour soil carefully picked away from the sound roots with a pointed stick, and worms destroyed, prior to returning to clean, well-drained pots just large enough to hold the roots comfortably, firmly surrounding these with good sandy peat. Vigorous plants with abundance of roots should have a small shift given. Return the plants to a warm part of a greenhouse, shading from bright sunshine, syringing

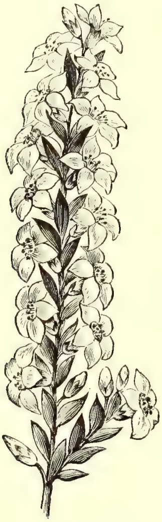

Fig. 83.
Epacris elegans.

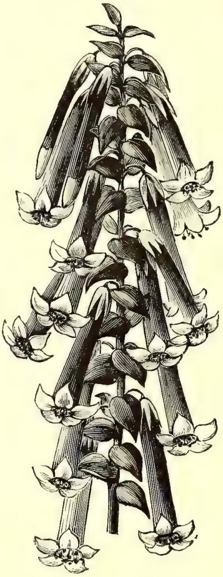

Fig. 84. Epacris miniata splendens.

twice daily for about ten days, during which time very little water ought to be given to the roots. After this good start the plants should have more light and air, with water at the roots as often as the soil approaches dryness.

When the young shoots have made good progress, or, say, late in July, the plants may be plunged in beds of ashes in a sunny position in the open air, there to mature their flowering wood. Winter them in a light position in cool airy greenhouse, and water carefully at all times.

EIGHTEEN GOOD EPACRISES.

ardentissima.
densiflora.
elegans.
Eclipse.
exoniensis.
Her Majesty.
hyacinthiflora.
,, candidissima.
,, carminata.
,, fulgens.
Jubilee.
Kinghorni.
Lady Alice Peel.
miniata splendens.
Princess Beatrice.
Rose perfection.
rubra superba.
Vesuvius.

EPIPHYLLUM.

Strictly speaking, epiphyllums are cactaceous, but are extensively grown in many gardens where no attempt is made to form a collection of cacti and succulents, and are included among greenhouse plants accordingly. They are easy to cultivate, very floriferous, and a well-grown plant is a beautiful object when in flower. E. Russellianum, with its varieties Gaertneri, Makoyanum, and superbum, are to be found in nurseries, and should be more generally grown in private gardens. E. truncatum and its varieties are the most familiar, and are worthy of the best cultural attention that can be bestowed on them.

Epiphyllums are easily propagated by cuttings or small branches. These if inserted singly in small pots filled with a mixture of loam, leaf soil, peat, crushed charcoal, and sharp sand, will root quickly in brisk heat. On their own roots, however, the plants are too dwarf and spreading to be of much service, unless in hanging baskets. Epiphyllums ought principally to be grafted on stocks with a clear stem 1 foot and upwards in height. There are two kinds of stocks available, Cereus speciosissimus and Pereskia aculeata for the taller stems. The first named was probably the original stock used, but appears to have gone out of favour.

Cereus speciosissimus is of erect growth, with a succulent angular stem. Large pieces, after being duly dried on a shelf for three or four days, may be rooted in well-drained 4-inch or larger pots, filled with the above-mentioned mixture, and will soon afterwards be ready for grafting. Make small vertical incisions in the angles with a knife, insert a small branch of epiphyllum, and fasten with a cereus spine thrust through. The union soon takes place in a temperature 65° to 70°. In this way neat standards may be formed, or the grafts may be inserted from the bottom to the top of the stem and a pillar of epiphyllums eventually result.

Pereskia cuttings may be rooted in heat at any time of the year and potted separately; they should be grown with single stems till these are tall enough and sufficiently stout for grafting. The time to graft pereskias is just when the epiphyllums are starting into growth. The process is exactly the same as with cereuses, the scions being fastened in the stems by means of pereskia spines, or the top of the stock may be split open and the small branch of epiphyllum inserted in this. No fastening other than the pereskia spine nor covering of any kind is required, but the worked plants must be kept in gentle heat and

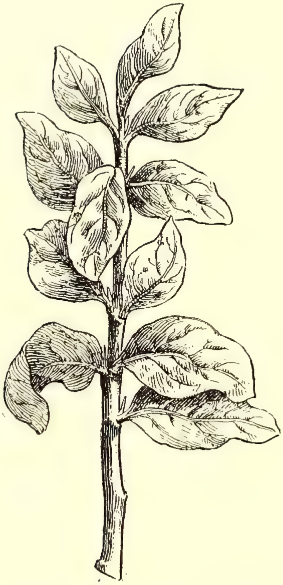

Fig. 85. Pereskia Cutting for Stock.

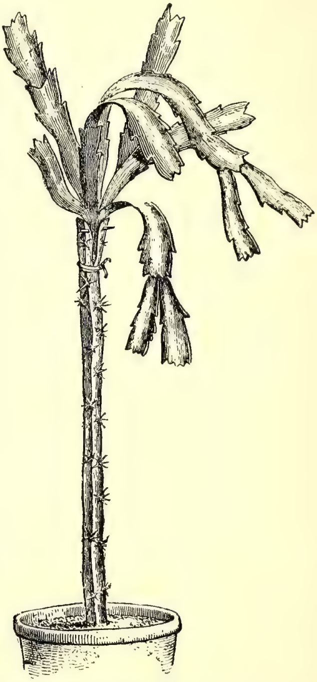

Fig. 86. Pereskia Stock grafted with Epiphyllum.

a moist atmosphere till the union is perfect, and afterwards till the autumn, when less heat is desirable and a rest necessary.

If started into active growth again the following February in gentle heat or the warmest corner in a greenhouse, fairly large heads will have formed by the end of July, when the plants ought to be given cooler but not shady quarters for the growth to mature preparatory to flowering. Winter the plants on dry greenhouse stage, in a temperature of 45° to 50°, and only give enough water to prevent shrivelling. If a long succession of bloom is desired, start the plants at intervals, commencing in February, and avoid hard forcing. They will open their flowers readily in a temperature of 60°.

After the flowering is over, and just before active growth begins, attend to what re-potting is necessary. They do not require much root room, a pot 8 inches in diameter sufficing for a large plant, and many are flowered in 5-inch pots. The soil that suits them is a mixture of two parts of sandy loam to one each of leaf-soil and mortar rubbish. Good drainage is imperative. Gentle heat and a moist atmosphere promote vigorous growth. After this is completed expose the plants to all the light and air possible, and they will then flower grandly the next season.

VARIETIES OF EPIPHYLLUM TRUNCATUM.

aurantiacum.
bicolor, white, edged with rose.
Bridgesi.
coccineum, rich, deep scarlet.
Marguerite de St. Amand.
magnificum, flowers large, white, tipped with rose.
Ruckerianum, reddish purple, violet centre.
salmoneum, reddish salmon.
Snowi.
spectabile, white, with purple margin.
violaceum, pure white, delicate purple margin.
,, superbum, pure white, rich purple edge.

ERICA.

Commonly called Heaths, from the similarity of the plants to the wild heather (calluna) of our moorlands. Ericas are undeniably beautiful when well grown. The name is derived from *erico*, "to break," referring to the brittle nature of the wood. In past times large collections of Heaths were grown in many gardens, but are rarely met with now. Handsome specimens may be seen at exhibitions, the result of twenty years and more of cultural care. These are mostly composed of the hard-wooded, slow-growing species that flower in the summer; for general decorative purposes the free-growing winter and spring flowering species are preferred, notably E. caffra, E. Cavendishiana, E. gracilis, E. candidissima, E. hyemalis, and E. ventricosa; these are grown in thousands for sale in flower markets, and few plants are more chastely attractive during their flowering season. Some of these last-named ericas will stand a considerable amount of rough treatment, including attempts to repot them by novices. Not so the harder-wooded species; the slightest mistake made with these, either in potting or watering, is liable to lead to the death, slow but sure, of the plants.

Ericas are only raised from seed by experts. The plants are increased from cuttings of firm, young wood. The soft-wooded varieties, being the first to form young shoots, are naturally the earliest to give suitable cuttings, and none should be subjected to a temperature higher than 60°. The plan of surrounding the pots containing the cuttings with moss in larger pots, and covering with a square of glass, as shown in Fig. 87, is a good one, as the pots are not liable to become unduly hot and dry, less moisture being consequently retained without having recourse to frequent waterings—a very important matter. Whether the cuttings are covered with a bell-glass, or with only a square of glass, the precaution should be taken of daily wiping the glass dry as a preventive of mildew and damp. Any cuttings that give signs of damping must be removed at once.

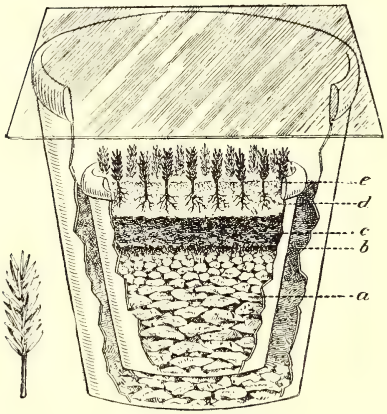

Fig. 87. Propagating Ericas.

References:—*a*, drainage; *b*, moss or turf; *c*, peaty soil; *d*, fine sandy soil; *e*, layer of pure sand.

The cuttings, when well rooted and slightly hardened, should have abundance of air and may be topped, deferring potting them singly till the following spring. The soft-wooded species will make fairly good progress during the second season, and should be topped sufficiently often to make them bushy. Only small shifts ought to be given. The hard-wooded species are slow in arriving at a serviceable size, and those who would be successful with them at exhibitions should purchase what are known as half-specimens, and by good culture gradually prepare them for the shows.

Cultural Details.—The repotting of ericas must always be regarded as a most critical proceeding. It has to be done though, and that, too, before the plants become badly root-bound and stunted in growth. This does not indicate the necessity for repotting the plants annually, especially specimen plants, as the cultivator may easily err in that direction, but rather that sound judgment must be exercised, gradually gained by experience, as to when a plant should be repotted. When the soil last added is well occupied by roots, and not before, a shift should be given, doing this either in March, April, or September, rather than during very hot summer weather.

The soil that suits soft-wooded species is a mixture of equal parts of the best hard brown peat, and softer, blacker fibrous peat, with a free admixture of sharp silver sand; but for the slower-growing hard-wooded species the compost should consist of two-thirds of hard peat to one of soft peat, with a few small potsherds of the size of kidney bean seed, and sharp silver sand freely incorporated. The peat should be pulled in pieces and all woody particles removed, and must be neither very moist nor dry when used. The pots to be used should be one to two sizes larger than the plants were previously in, or only just large enough to admit of good drainage and a little fresh soil being given. They must be perfectly clean, and, if new, ought to be soaked in

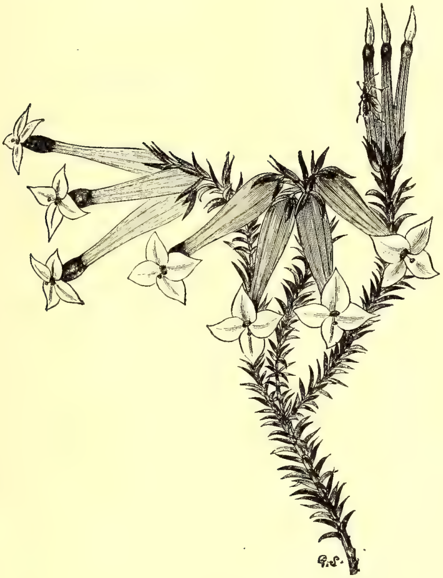

Fig. 88. Erica Irbyana.

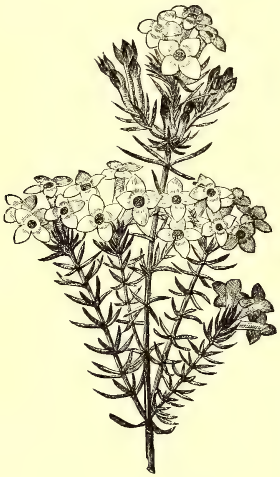

Fig. 89. Erica mundula.

water for half-an-hour, then dried, or they will absorb moisture from the new soil and injure the plants. There will not be room in the pots for heavy drainage, and more than ordinary pains must be taken in arranging that which is given, covering the moss used over the crocks with some moderately coarse peat.

The plants to be repotted ought to be in a moist but not decidedly wet state at the roots when turned out of their pots, and the drainage crocks carefully removed, disturbing the roots as little as possible. Make the base of new soil in the pots slightly high in the centre, this fitting into the hollow in the old ball of soil and roots caused by the removal of drainage, and take good care that the height of the collar of the plant is right. This must not be buried deeper than it was before—deep potting frequently resulting in the loss of the plant—nor unduly raised, or sufficient depth will not be allowed for proper watering. The new soil must be gradually filled in round the sides, and be rammed as hard as a blunt potting-stick can make it, otherwise the water applied will drain away rapidly through the new soil, with the consequence that the older containing the roots will gradually become fatally dry, the death of the plant resulting. Arrange the newly-potted plants in either a cold pit or greenhouse, and admit less air than formerly till the roots are beginning to take possession of the new soil.

Summer treatment has to be varied according to circumstances. Small plants must not be unduly exposed to drying winds and sun. They should be plunged in ashes and covered with glazed lights, drawing these off in fine weather, and blocking them up over the plants when the rainfall promises to be heavy. Larger specimens ought also to have their pots plunged or otherwise screened from bright sun, and the plants must be protected from heavy rains by means of thick glazed canvas blinds on rollers. They require exposure to abundance of light and air to harden and prepare their growths for flowering. All should be arranged in their winter quarters about the middle of September, or before severe frosts are experienced.

Ericas ought never to be confined in a close moist atmosphere, or in a high temperature. Span-roofed structures, with glazed sides and facilities for affording abundance of front and top air, are what best suits them, as well as other hard-wooded greenhouse plants. Arrange them thinly and raise them well up to the light. Never resort to syringing in winter, and admit air freely when this can be done without an injurious draught. The temperature should be kept above freezing point—from 36° to 46° suiting the plants well throughout the winter, and 40° to 50° with more air in the spring. Only sufficient fire-heat should be afforded at any time to exclude frost or expel damp. On the least signs of mildew, dust with sulphur.

Watering is an operation the importance of which cannot be over-estimated in the case of ericas. More plants are lost through reckless watering than from all other causes put together. It is only by experience and close observation that growers are enabled to decide exactly when to give water. On no account ought it to be given before the soil has become somewhat dry, but not dry enough to cause the hair-like roots to shrivel, the operator being guided by the appearance and feel of the soil rather than by ringing the pot with his knuckles. Mere driblets of water are ruinous. Wait till the soil is in a condition to receive water readily, and then apply enough to well moisten the whole of it. Never draw water from hot-water pipes for these plants, as there may be iron or other injurious elements in it. Nor ought hard water to be used, as there may be lime in this, and mischief thereby done. Soft rain water, or water softened by long exposure in an open tank should, where possible, be used, and failing this, experts recommend thin or perfectly clear soot water as being safe and also stimulating. A bag of soot sunk in a tank would be capable of rendering the water fit for established ericas for several weeks in succession. It must be absolutely clear and weak.

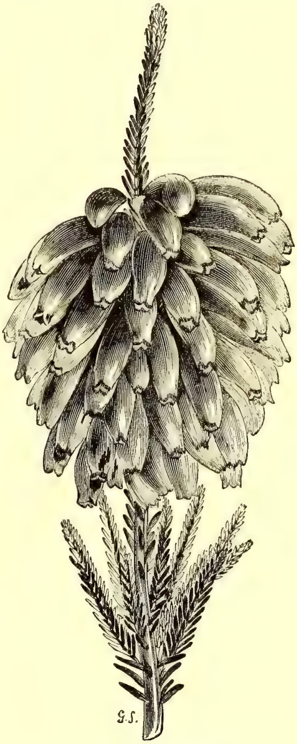

Fig. 90. Erica mammosa.

Very little pruning is needed in the case of the slow-growing, hard-wooded species, the regulating being done by topping young plants, and by training or depressing the stronger growths of larger specimens. In training these only a few short painted stakes are used, either fine wire or strong thread being strained from these in all directions so as to form a semi-globular head. The training ought to be done in the winter, and the shoots then partially recover their erectness before flowering, thereby obviating the stiffness which is observable when the training is done only a short time before the flower buds expand.

The more rapid, erect-growing, soft-wooded ericas ought to be freely pruned soon after they have ceased flowering. Reduce the previous season's growths to at least one-third of their length, and, in some instances, they may be more severely shortened, but never below the leaves, doing this to promote the growth of abundance of moderately strong shoots to flower the following season.

SELECTIONS.

Twenty-four easily grown Ericas.

Bowieana, flowers white; October.
candidissima, white; winter.
caffra, white; winter.
Cavendishandi, rich yellow; May.
cerinthoides coronata, scarlet; May to November.
colorans, white and red; April.
gracilis autumnalis, purplish red; September.
grandinosa, white; March.
hybrida, red; May.
hyemalis, pink and white; winter.
Lambertiana, white; May.
Linnæana, white and red; spring.
mammosa, purple; autumn.
melanthera, tinged pink; autumn.
mundula, white and purple; June.
persoluta alba, white; March.
perspicua, white; May.
propendens, purple; June.
pyramidalis, pink; March.
regerminans, red; May.
Spenceriana, purplish lilac; spring.
ventricosa, in variety, various; April.
verticillata, scarlet; summer.
Wilmorei, white; spring.

Seventeen Exhibition Ericas.

Austiniana, growth free, flowers red; July to September.
*Aitoniana Turnbulli, growth slender, free-flowering, white and pink; June to September.
cerinthoides, growth loose, flowers large, scarlet; May to November.
depressa multiflora, growth dense, flowers yellow; May to July.
*Eweryana, erect, growth free, flowers dark red and yellow; July to November.
Faireana, growth medium, flowers large, rich rose; June to August.
ferruginea superba, growth strong, free-flowering, red; July and August.
Hartnelli virens, growth free, flowers profuse, red and green; June and July.
Irbyana, growth strong, flowers numerous, white, tinged with red; July and August.
*Jacksoni, resembles E. Austiniana, but with flowers of a deeper shade of red; July to September.
Lindleyana, growth free, flowers numerous, red, with olive tips; May and June.
*Marnockiana, growth compact, floriferous, deep crimson; August and September.
*obbata, growth free, flowers large, waxy white; June to August.
*Parmentieriana rosea, growth free, flowers abundant, red; July and August.
Paxtoniana, habit good, flowers purple and white; June and August.
retorta major, growth free and floriferous, pale red; July and September.
ventricosa grandiflora, growth stiff, flowers bright, deep crimson; June and July.

* Six of the most popular species.

ERIOSTEMON.—This family of Australian plants are deservedly popular among lovers of hard-wooded greenhouse evergreen shrubs, and might with advantage be more generally grown than they are. All of them flower either during the winter or early in the spring, succeeding well in a cool, airy greenhouse from which frost is excluded, and are amenable to gentle forcing. Some of the best of them are E. buxifolius, flowers pink or rose-coloured; E. cuspidatus, red; E. intermedius, white suffused with rosy pink; E. myoporoides, rose-coloured; E. neriifolius, rose-coloured or pink; E. salicifolius, pink; and E. scaber, white, tinged with pink. All the species may be propagated by cuttings in the spring, similarly to correas (see page 170), but are principally increased by grafting on stocks of either Correa alba or Eriostemon buxifolius. These "worked" plants are preferred to any from cuttings.

March is the best month for repotting eriostemons, giving a small shift to those strongly rooted, using clean, well-drained pots, and a compost of equal parts good fibrous loam and peat, with plenty of sharp sand added. Pot firmly. Any plants in a sickly state should be freely pruned, and then partially shaken clear of the sour soil which they are in. After trimming their roots repot in fresh compost, giving them pots just large enough to hold their roots, and they should have the benefit of gentle heat for a few weeks. A little warmth is also desirable while healthy plants are forming fresh growth, afterwards gradually exposing them to all the light and air possible. During the summer months they may be arranged in the open air, with various other hard-wooded plants, returning them to a light, airy greenhouse before they are damaged by cold rains or frosts. Eriostemons are naturally of a bushy habit of growth, and all the pruning needed is the shortening of loose growths, either when the flowers can be used in a cut state or directly after they have faded.

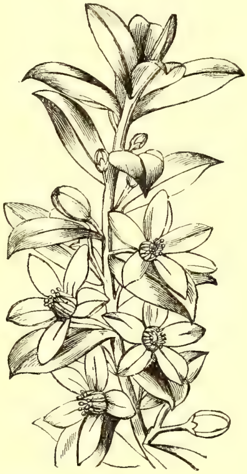

Fig. 91. ERIOSTEMON BUXIFOLIUS.

ERYTHRINA.—There are nearly a dozen species of erythrina to be found in botanical collections, but for all ordinary cultural purposes they may safely be reduced to two, E. christa-galli and E. herbacea, with varieties and hybrids raised from these. The Common Coral-tree, E. christa-galli, from Brazil, is most frequently grown in private gardens, also bedded out in the London and other parks. The type attains a height of 3 to 4 feet, and produces rich coral-red flowers from May to July. Varieties raised from this are Cottyana, flowers deep rich red; flori bunda, rosy crimson; Madame Belanger, rich dark reddish crimson; ruberrima, large, brilliant crimson-tinted rose; and spectabilis, with beautifully yellow variegated foliage. E. herbacea, Carolina, does not exceed 3 feet in height, and produces its flowers on elongated spikes from June to September; colour, deep scarlet. E. Bidwilli is a hybrid between E. herbacea and E. christa-galli. Both species form stout root-stocks, from which strong flowering stems, which must not be topped, push forth in the spring, these dying down in the autumn. When flowered in pots erythrinas should receive liberal treatment at the roots. This ought to include a change of soil each season just as the root-stocks are pushing fresh shoots, and, when strongly rooted in this, abundance of water and liquid manure must be given, accompanied by daily syringings to keep the foliage free from red spider.

EUCOMIS.—Of this small family of half-hardy Cape bulbous-rooted plants, E. punctata only is recommended for greenhouse culture. This species forms broad-spreading leaves, and produces tall mottled spikes of small wax-like green and brown fragrant flowers. Propagation is readily effected by offsets removed in September or October. A rich loamy compost is suitable. Rest the plants during the winter, watering sparingly. When growing strongly, water freely and apply liquid manure when the flower spikes are developing.

EUPATORIUM.

No shrubby plants are more easily grown than Eupatoriums. The flowers in a cut state are not particularly popular as they bear too strong a resemblance to the dense trusses of ageratum, but the plants are remarkably floriferous and are of good service for conservatory and greenhouse decoration. E. macrophyllum (synonym Hebeclinium macrophyllum), from Tropical America, is tall-growing, and produces large heads of white flowers in the autumn. E. odoratum, a Jamaica species, grows to a height of about 2 feet, also flowers in the autumn; colour, pinkish white, sweet-scented. O. riparium, South America, is of a branching, spreading habit of growth, flowers small and white, produced in the winter. O. Weinmannianum, South America, is the most compact and shrubby, and produces white, sweet-scented flowers during the autumn and winter.

Young shoots taken off in March and inserted in sandy soil, placed in a temperature of about 65° and kept close, root quickly. Top the young plants when fairly growing, and pot singly when they are pushing side-shoots. Grow them in gentle heat not far from the glass, top often enough to form a good bush, and gradually shift into larger pots, using a mixture of two parts sandy loam to one each of leaf soil and sifted decayed manure. Pot firmly. During the summer the plants may be arranged in the open on a bed of ashes, and should be kept well supplied with water. Remove them to a greenhouse about the middle of September, and assist the plants with liquid manure.

If large specimens are desired, cut down the plants after flowering, and repot when they commence growing. The old ball of soil and roots may be severely reduced, this admitting of replacing in pots no larger than they were in before. The plants may be kept somewhat warm and close, till they recover from this severe treatment, afterwards growing them first in frames and then in the open as before. They will pay for receiving a shift into larger pots, or they may be planted out in light loamy garden soil, lifting and repotting in September. Top any shoots taking an undue lead only. If small plants are preferred, propagate a sufficient number each season and throw the old ones away, making an exception in favour of the slower-growing E. Weinmannianum.

Farfugium grande.—See Ligularia Kaempferi aureo-maculata.

Ficus elastica.—See Commercial Floriculture.

Fuchsias.—See "Florists' Flowers," page 29, Vol. II.

GREVILLEA.—Six species of this Australian shrub are sometimes recommended for greenhouse culture, principally for the elegance of their foliage, but only G. robusta and its variety, elegantissima, are generally grown. For cultural details see acacia, though grevilleas are usually grown without being topped.

Habrothamnus (Cestrum).—See Conservatory Climbers.

HARDENBERGIA.—There are only two species belonging to this genus of Australian twining plants, and both are evergreen, producing racemes of small pea-shaped flowers from the axils of their leaves. H. Comptoniana, of which there are several synonyms, flowers in March; colour, purple and white. H. monophylla is later in flowering, and purple in colour. Both can be raised from seed, which, if very hard and dry, should be softened in hot water, prior to sowing in peaty soil and a brisk heat. Short cuttings of firm young shoots may be taken any time from March to June, inserted firmly in sandy peat soil, covered with glass and rooted in a temperature of 55° to 65°. From the small pots in which the young plants are first placed, gradually shift into larger sizes, using a compost of equal parts of loam and peat, with a free admixture of sharp sand. Pot firmly, and during the growing season water freely, applying weak liquid manure occasionally. Partial shade suits hardenbergias, and H. Comptoniana planted in a border, and trained up wires or pillars to a greenhouse-roof, is very attractive. All the pruning needed is the removal of irregular growths in February.

HEDYCHIUM.—These are truly noble plants for conservatory and greenhouse decoration. They form tall stems, with handsome canna-like leaves, which produce grand spikes of flowers, succeeded occasionally by attractive red fruit. For greenhouse culture two species are recommended, namely, H. flavum, from Nepaul, and H. Gardnerianum, a native of the East Indies. The first attains a height of 3 feet, and produces large spikes of fragrant yellow flowers in July. H. Gardnerianum is somewhat taller in growth, and

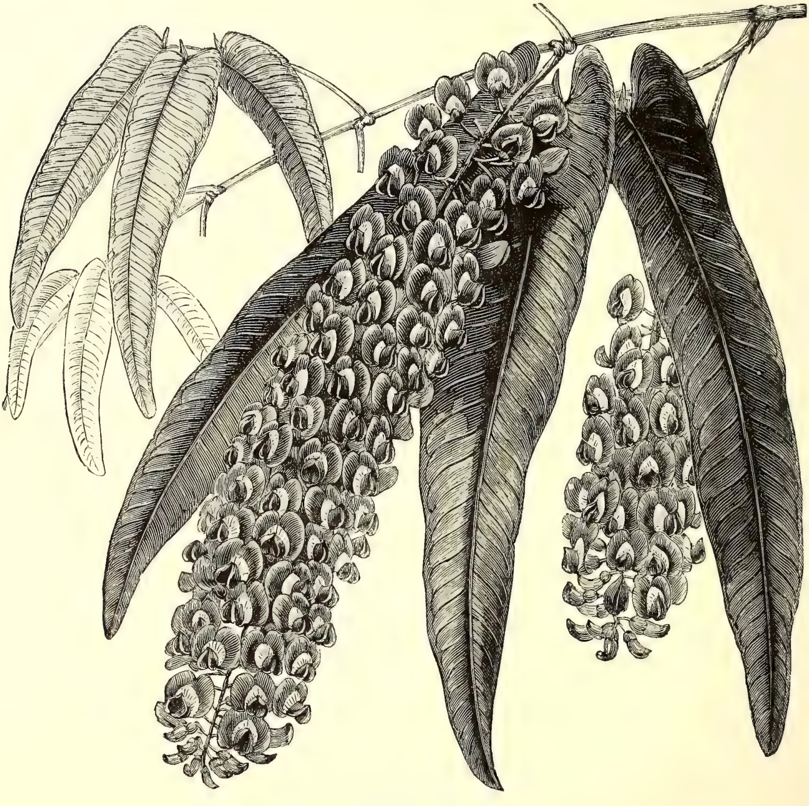

Fig. 92. HARDENBERGIA COMPTONIANA.

the noble spikes of lemon yellow, sweet-scented flowers are usually at their best in July. Both species are nearly hardy, and succeed well in a cool greenhouse. They are increased by division of their rhizomes, or creeping stems, in March or April. Hedychiums are frequently left in the same pots or tubs for many years in succession, and flower fairly well under this starvation treatment. Far better results, however, attend the practice of giving them fresh rich soil every spring. Turn them out of their pots, fork away much of the old soil from the roots, and return to either fresh pots or tubs just large enough to hold the rhizomes comfortably. Good drainage should be afforded because hedychiums must have abundance of water and liquid manure when growing. The stronger the growths formed, the finer will be the flower spikes, only feeble growths refusing to flower. After the flowering period less water will be required. The old stems may be cut down in the autumn, and the plants wintered in the back-ground of a greenhouse or conservatory.

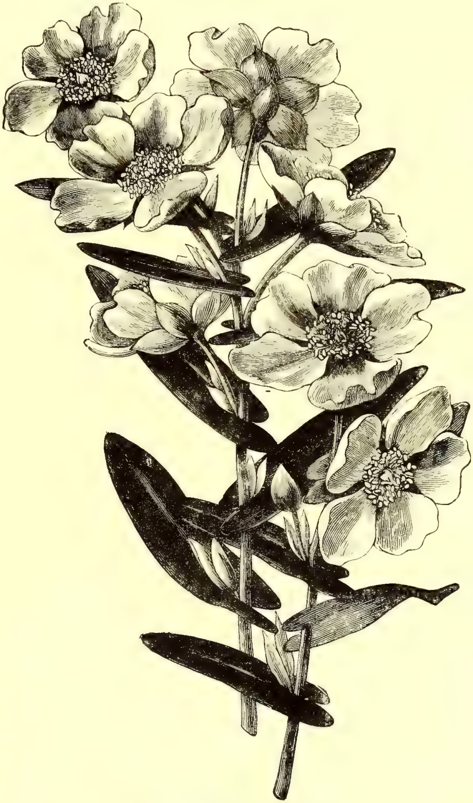
Fig. 93. HIBBERTIA PERFOLIATA.

HIBBERTIA.—Of this comparatively large genus, about five species are recommended for greenhouse culture. H. Cunninghami, Western Australia, is of slender twining growth, and produces yellow flowers in July. H. dentata, New Caledonia, is also a twiner; flowers dark yellow; spring and summer. H. grossulariæfolia is of trailing habit, and well adapted for filling hanging baskets; flowers, yellow and small; May. H. perfoliata, West Australia, may be trained to form a loose bush, being less of a trailer than the others, and floriferous; colour soft pale yellow. H. volubilis, New South Wales, is strictly a twiner, producing showy yellow flowers in summer. Hibbertias are propagated by means of short cuttings of moderately firm shoots, from April to August inclusive, inserted in sandy peat, and covered with glass in a temperature of 55° to 60°. From small pots they should be gradually shifted into larger sizes, employing a compost of equal parts good loam and peat, with plenty of sharp sand. During the growing season give water freely, but it must be applied in moderation at other times. Train frequently. All the pruning needed is the removal of loose, irregular growths in February. Hibbertias succeed best in the warmest part of a greenhouse or light conservatory.

HOYA.—For greenhouse culture there is only one species of the Wax Flower available—H. carnosa. This is a native of Queensland, and may be classed as one of the most beautiful of greenhouse and conservatory climbers. It forms thick, durable leaves, and if properly treated produces numerous trusses of pinkish-white waxy flowers during the summer. H. c. variegata has white-margined leaves. Cuttings of growths formed in the preceding year, inserted in March or April, in well-drained pots filled with sandy peat, covered with a bell-glass and placed in a temperature of 75° to 85°, root freely. Layering is a quicker method of securing fairly large plants. In the spring remove some of the leaves from selected growths where they can be pegged down into pots of sandy peat, and keep the soil uniformly moist till the roots are plentiful, when the layers may be detached from the parent plant. Train the plants in a light sunny position, the glazed end of a greenhouse answering well, and allow them to spread and branch naturally. They may be either planted out in narrow borders or gradually shifted into large-sized pots, in either case using a mixture of equal parts of peat and loam, adding charcoal, mortar rubbish, and sand rather freely. Well-established plants should have abundance of water during the summer, but must be kept somewhat dry during the winter. The leaves ought to be sponged clean occasionally, and mealy bug prevented from taking possession of the plants. It is a mistake to cut the flower-heads, the same footstalks if left on the plants producing flowers for several seasons. A drop of pellucid nectar hangs like a tear on many of them, and hence the Hoya is popularly called the "honey plant."

HUMEA ELEGANS.—See SUBTROPICAL PLANTS, page 228, Vol. I.

HYDRANGEA.

In private gardens hydrangeas are not nearly so extensively cultivated as they are for the markets, more especially Covent Garden, but they ought not to be so neglected. The large globular flower-heads of the most popular species, H. hortensis, may be somewhat heavy in appearance, but they last for a long time, and when the colour is blue instead of pink, the effect is considerably enhanced. H. hortensis, or the Common Hydrangea, is a native of China, and proves to be quite hardy in some parts of England. The colour varies from pink to blue shades according to the soil the plants are rooting in, and the flowering season extends from April to September inclusive. H. japonica, cærulescens, rosea alba, stellata prolifera, Thomas Hogg, and variegata, are varieties of H. hortensis, the one with variegated leaves when these are fresh being very beautiful. H. paniculata grandiflora, from Japan, produces large branching spikes of white flowers in the summer, and is well worthy of pot culture.

Although H. hortensis develops, in the course of a few years, into large bushes producing dozens of flower-heads each season, by far the greater majority of plants are thrown away after having given one large corymb of bloom. There are two methods of raising plants that shall give a single head of flowers, both of which answer well. The dwarfest plants are had by rooting strong, well-matured tops, inserting them singly in small pots in August, and plunging them in brisk bottom heat, but keeping the frame in which they are plunged moderately cool. The end in view should be to induce the cuttings to form strong roots, and not to burst into top growth. When they have well filled the pots with roots, expose these little plants to the full light, air, and sun. After the leaves fade and fall, give only enough water to keep the wood plump. Winter them on a cool greenhouse shelf. In February shift these sturdy little plants into 5-inch or 6-inch pots, using a rich loamy compost, and start them into growth in a moist heat. All that are sufficiently strong will soon show a flower-head, this rapidly attaining to a great size, also colouring well in a light position, in gentle heat. In this way plants not more than 1 foot high can be had with flower-heads almost as much in diameter. Those which give no signs of flowering after four or five leaves have developed are usually thrown away.

The other method consists in converting strong, young, flowerless shoots into cuttings in the spring. These inserted singly in small pots, root quickly in brisk heat. After the well-rooted plants have been shifted into either 5-inch or 6-inch pots, they are grown as strongly and sturdily as possible in frames, exposing them to the full sunshine and air during the summer and autumn. Plump, terminal buds then form, fine heads of flowers developing during the following spring or summer. These plants may be wintered in a frame, pit, or cool greenhouse.

After they are started into activity the following spring, keep them uniformly moist at the roots; and as growth advances feed liberally with clear liquid manure. These single-stemmed plants may either be cut down after flowering and converted into bushes, or thrown away.

The small, pure white-flowered variety, Thomas Hogg, is best grown as a neat bush, every moderately strong growth forming on a plant in one summer flowering the following year. Large bush plants wholly cut down after flowering, will not flower during the next season. Only those shoots that have grown strongly throughout the summer will flower the following year. When pruning large specimens, therefore, only cut down the growths which have flowered, leaving the rest to flower during the next season, or have two sets of plants, cutting those which have flowered entirely down, and allow them a year to make fresh flowering growths.

The natural colour of H. hortensis is pink, but this can be changed to a bright blue by the use of certain constituents in the soil when potting, or by applications of chemicals when watering. Loam naturally impregnated with iron changes the colour of the flowers, as also do iron filings mixed at the rate of one part to every five parts of loam. A very light sprinkling of powdered sulphate of iron added to the potting soil has a similar effect. Alum dissolved at the rate of one tablespoonful in a gallon of water, letting it stand for twelve hours, and applied twice a week, has been found in some instances to change the flowers to a blue shade.

Autumn raised and duly rested plants of H. hortensis variegata, started into growth in heat in February, come beautifully variegated, but lose much of their attractiveness when in flower. Hydrangeas generally require a sound, rich, loamy compost, and liberal treatment at the roots during the time they are growing.

H. paniculata grandiflora (Fig. 94) is very distinct from H. hortensis, and needs different treatment. Cuttings of firm young wood may be rooted whenever they can be obtained, and the plants should be grown strongly. No topping ought to be done after two or three strong shoots are formed. The plants may either be grown in pots plunged in the open, or planted out in good ground. The species is quite hardy, and strong plants may be lifted and established in pots for forcing or flowering in a greenhouse, as required. All shoots, whether the plants are in or out of pots, should be cut down to within 2 inches of the older wood in late autumn, and the strong resulting growths in spring will give fine panicles of bloom. Plant out after flowering.

ISOLEPIS.—Isolepis gracilis is better known to cultivators under that name than by the more modern one, Scirpus riparius. There are few better plants for arranging along the fronts of greenhouse stages than this little "Club Grass." It is a perennial, but is the most ornamental in a young state, or before dense tufts are formed. Its cultural requirements are of the simplest description. Seed may be sown in a pan filled with leaf soil and loam covered with glass and placed in a temperature of 60° to 70° to germinate. The tiny plants, if the seed is not too heavily covered, will come up thickly, and should be early moved in small patches, placing these in $2\frac{1}{2}$-inch pots of rich, loamy soil. Keep them growing in gentle heat, taking care not to turn them yellow by over-watering. No shift need be given unless larger plants are required, in which case move them into

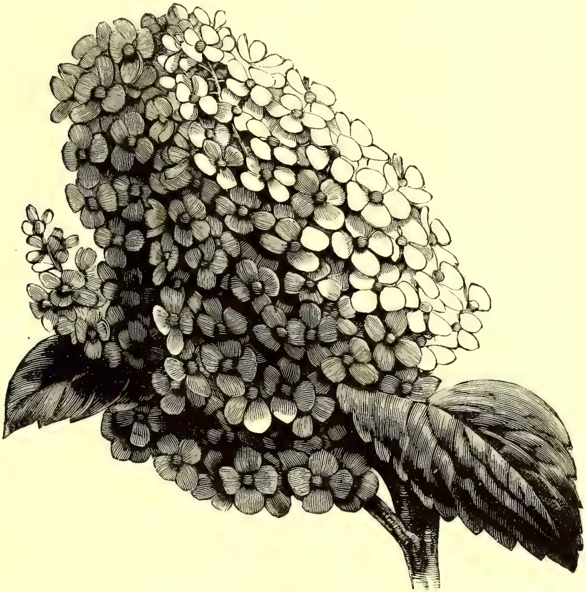
Fig. 94. HYDRANGEA PANICULATA GRANDIFLORA.

5-inch pots. Isolepis may also be propagated by splitting old clumps into quite small pieces, in preference to using large divisions, and treating as advised for seedlings. When well rooted all must have abundance of water, and liquid manure will further serve to keep them fresh and green. Ordinary greenhouse temperature is suitable after the plants are well established.

JASMINUM.—See CONSERVATORY CLIMBERS.

KALOSANTHES.—See CRASSULA.

KENNEDYA.—These twining perennials are often grown in lofty conservatories, but owing to the lightness of their growth, and the elegance of their flowers, are more suitable for greenhouses. K. coccinea major, scarlet; K. eximia, scarlet; K. nigricans, deep violet-purple, and K. Stirlingi, scarlet, are all to be met with occasionally, but the most popular is K. prostrata Marryattæ, which is of free growth, and produces small bunches of pea-shaped scarlet flowers freely from March to June. For cultural details see Hardenbergia, to which genus kennedya is nearly allied.

LACHENALIA.

Of these South African bulbous-rooted plants there are several beautiful species and varieties which are admirably adapted to greenhouse culture. A few of the best of these are L. aurea, free growing, flowers yellow; L. luteola, yellow with green and red markings; L. Nelsoni, considered the best of the yellow varieties, flower spike strong and the colour rich; L. pendula, of vigorous growth, strong spikes, flowers rich crimson tipped with green; L. tricolor (syn. L. quadricolor), flowers bright green and red; and its yellow variety lutea, perianth yellow.

Lachenalias can be raised from seed, but the usual method of propagation is by offsets at potting time. Early in August is a good time to repot the bulbs. They should be removed from the dry soil in which they have rested, and graded into three sizes of large, medium, and small bulbs, keeping them apart with a view to having a uniform display of flower spikes. Lachenalias are sometimes flowered in 8-inch pans, but are more effective and generally serviceable in 5-inch pots. Reserve the pans for the smaller offsets, disposing these somewhat thickly in them, and place about six medium or large-sized bulbs in each 5-inch pot. A mixture of two parts fibrous loam, one part each of leaf soil and flaky manure, and one part of coarse sand, is what lachenalias thrive in. Embed the bulbs firmly in this, with a little sand under them, and cover with about half an inch of soil. Arrange the pots in a cool, shallow frame on a bed of ashes, and give a watering to settle the soil about the bulbs. In this frame they ought to remain till November or later, ventilating freely in mild weather and protecting from severe frosts. If moved into a greenhouse long before the flower spikes show, they ought to be assigned a light, airy position, yet well out of cold draughts, a swing shelf in a greenhouse answering well. Avoid over-watering in the early stages of growth, and apply liquid manure, or better still, a light surfacing of Standen's manure when the flower spikes are advancing. A dry heat has the effect of stunting the growth, and so also have cold currents of air.

Lachenalias are sometimes used for filling hanging baskets made of wire; the baskets are lined with moss, soil placed in them, and the bulbs disposed as the filling proceeds so as to face downwards at first, then outwards, and lastly upwards near the surface. If these baskets are suspended in a cool pit or house, and the soil kept moist, the bulbs will push their growths through the moss and between the wires outwards, globular masses of bright and elegant spikes resulting.

Lachenalia flowers retain their freshness from six weeks to two months in a cool shady house, and keep well in a cut state. After the flowering period is past the plants ought to be exposed to the full sun to promote ripening, and when the leaves are dead water must be entirely withheld, till the bulbs are started afresh at the time above stated.

LAPAGERIA.

Lapagerias hold their own among the most beautiful of greenhouse climbing plants, and are particularly effective when trained over a greenhouse or conservatory roof, or against the shady ends and walls of these structures. They can be successfully grown in pots, and for the late summer exhibitions good specimens have weight in a collection of six or more stove or greenhouse plants.

The original species, L. rosea, was introduced from Chili in 1847, and its merits were quickly appreciated in this country, though all growers alike have not been uniformly successful with it. It produces rosy-crimson flowers from the axils of the leaves, firm trailing growths producing wreaths of lovely bell-shaped flowers. Strong plants are seldom without few or many flowers, and the durability of the blooms is equally satisfactory. The flowers differ somewhat on plants which have been raised from seed, and are generally inferior to those of plants raised from layers; still there have been a few improvements, of which the variety known as L. rosea superba may be cited as an instance; but good cultivation also has the effect of improving the size and colouring of the flowers. In purchasing plants it is a safe rule to have them from layers.

Lapageria alba, a pure white form, is the most valuable of all, the waxy white of the blooms never failing to please, while their value to makers of wreaths, crosses, and other floral ornaments is universally recognised.

Those who desire to raise seedling lapagerias can do so by sowing in March in pans of sandy peat and leaf soil in a temperature of 55° to 60°, covering with squares of glass, and shading heavily to keep the soil constantly moist till the seedlings appear. It is by layering, however, that lapagerias are principally increased. Early in the year select medium-sized firm growths, and peg these down in a bed or box of sandy peat soil, only about half length of the leaves showing above the surface. If the soil is kept constantly moist and a genial temperature maintained, roots will eventually be emitted from nearly every joint, and a shoot issue from the axil of the leaf. When strongly rooted the plants are detached, placed singly in small pots, and kept in gentle heat to encourage free growth. For the first two or three years the progress of small plants is usually slow, and for this reason the propagation and preparation of lapagerias is usually left to nurserymen.

February and March are the best months for repotting these plants. They form coarse roots freely, and soon degenerate if long cramped by want of space. Healthy plants with active roots may receive a liberal shift, and tubs are preferable to large pots. Ample drainage must be provided for carrying away the abundance of water that strong-growing plants must receive during the summer. The compost must also be of a nature that will not quickly run together or become sodden. To three parts of sound fibrous peat and one of fibrous loam roughly broken in pieces, add charcoal in fairly large nodules, broken potsherds and silver sand freely, spreading any loose roots there may be well out into the new soil, which must be pressed into a firm but somewhat yielding mass. Plants required for exhibition may be trained over a roof or wall trellis, taking them down and training to a tall globular trellis when they commence flowering. The specimen (Fig. 95) was grown by Mr. W. Finch for James Marriott, Esq., Coventry.

The finest plants are had by planting out in well-drained borders, using soil similar to that recommended for pots. Plant in March and keep the old ball of soil and roots

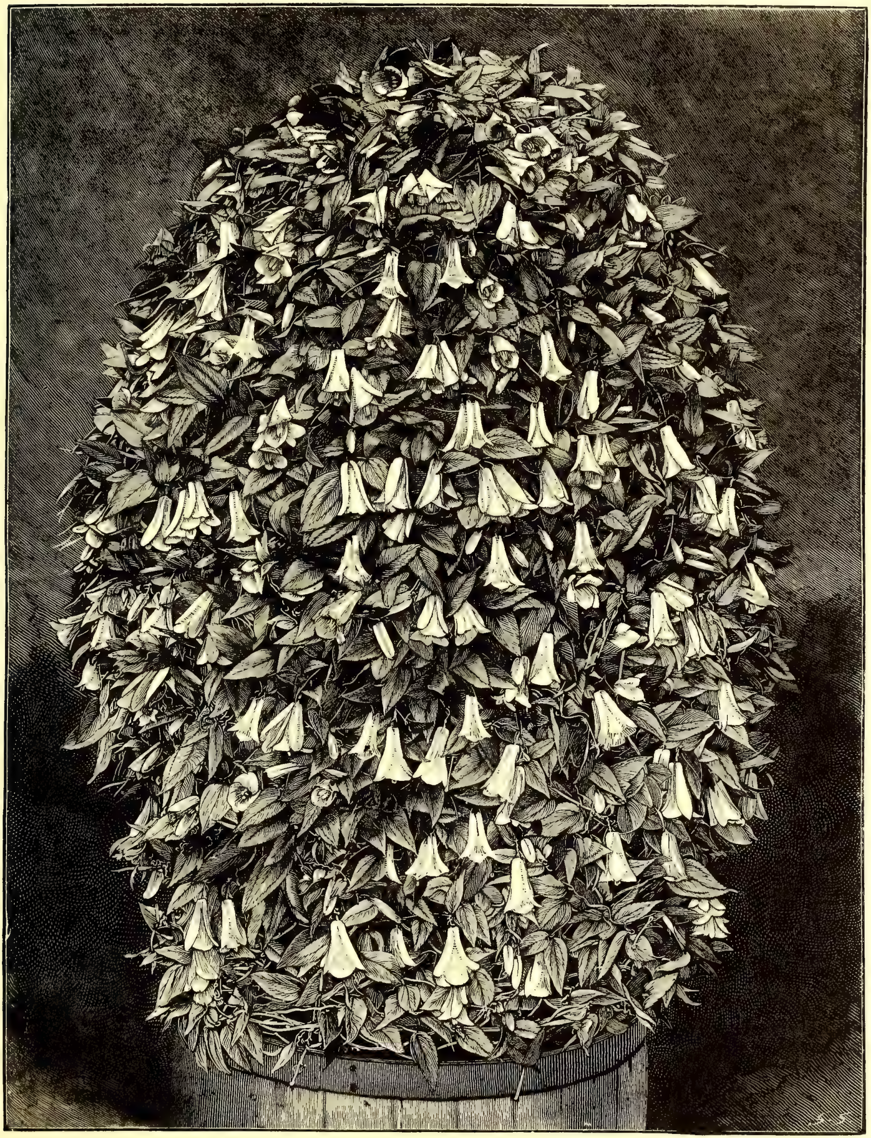

Fig. 95. Lapageria alba. (*From the "Journal of Horticulture."*)

constantly moist till the roots have spread into the new soil, when this too must have abundance of water.

An ordinary greenhouse or conservatory temperature suits lapagerias, and they ought to be shaded from strong sunshine. During the late spring and early summer months syringe them daily, ceasing when the flowers are expanding. The growths should not be topped but trained thinly, allow them to branch naturally. Also take particular care of the strong young shoots which spring asparagus-like from the underground stems. Slugs are with difficulty kept from these. Protect with old lamp chimneys or other contrivances till the stems become too firm for the teeth of the molluscs. These strong young shoots grow rapidly, and spread to a considerable distance in one season. They are the means by which the life of the plant is prolonged.

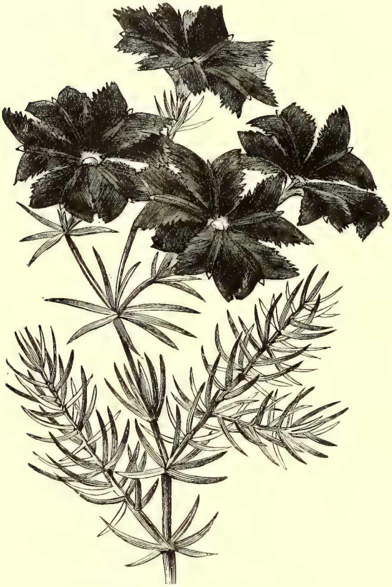

Fig. 96. Leschenaultia biloba major.

Thrips, and in a lesser degree green fly, are insect pests that spoil many lapagerias. They are induced by a too dry atmosphere, which is also inimical to the plants. The pests can easily be kept under by nicotine fumes applied occasionally. Brown scale and mealy bug sometimes gain the upper hand, but may be prevented by timely sponging with soapy water. It is while they are comparatively small that the plants should be under constant surveillance, in laying the foundation for thrifty growth in after years.

LESCHENAULTIA.—Those who understand the culture of these New Holland plants are invariably rewarded with a lovely display of bloom distinct in its character from anything else available in the late spring and early summer months. L. biloba major is considered the most beautiful blue-flowered shrub in cultivation. The plant rarely exceeds a height of one foot, and is of a branching floriferous habit of growth—quite a gem in fact. L. formosa (syn. L. Baxteri) also attains a height of one foot, and produces scarlet flowers freely from June to September. It forms a good companion for L. biloba major. Neither can be said to be of easy culture, as they require as much or more care expended on them as do Ericas—but well repay for skilful attention. They are increased by cuttings made from the firm tops of young shoots in the late spring or early summer months, in the same way as Ericas, see page 184, or they may be covered with a bell-glass. A temperature of 50° to 55° is suitable. From quite small pots move the plants into larger by small shifts, according as they require more root-room. The soil used for potting leschenaultias should consist of two parts of good fibrous peat to one of silver sand. Drain the pots carefully and pot firmly, taking care not to sink the stems. After repotting, which may be done in March or April, keep the plants in the warmest part of the greenhouse, or in a close frame for a fortnight or so, but at all other times they must be kept in a light, airy position. Exposing them to all weathers during the summer is apt to ruin the plants. Never let them become very dry at the roots, and be careful not to make the soil sour by over-watering. Use soft water, or water softened by exposure. Topping the young plants to make them branch, and shortening any irregular growths after flowering, is all the pruning larger plants need.

LIBONIA.

Where there is much conservatory decoration to provide for libonias are frequently cultivated extensively, and a few plants, well grown, are a welcome addition to a collection of greenhouse plants. L. floribunda, introduced from Brazil as late as 1862, rapidly grew into favour with plant-growers. This species attains a height of about 2 feet, and gives a profusion of scarlet and yellow tubular flowers during the winter. L. Penrhosiensis was the result of crossing L. floribunda with an allied plant, Sericographis Ghiesbreghtiana, and combines in itself the good qualities of both parents. It is more robust in growth, has better foliage than L. floribunda, and produces showy rich crimson flowers freely in winter.

Both kinds are propagated by cuttings of young shoots, taking these off newly-started old plants in February or March. They root freely in a close frame and a temperature of 75° to 80°. Place the newly-rooted plants in small pots, and grow them in gentle heat. If grown sturdily in frames during the summer they branch naturally, and form neat little pyramids, flowering the first season in 5-inch or 6-inch pots. They ought to be arranged in the warmest end of a greenhouse during the winter, low temperatures causing the leaves to drop prematurely.

Afford the plants a slight rest after flowering, then prune freely, much as fuchsias are treated. When fresh growths are showing, the plants may be turned out of their pots, have their roots partially cleared of old soil and trimmed prior to placing in the same-sized pots they were in previously. They are assisted in growth by gentle heat, but later on, may be moved to frames or pits where they can be well attended to during the summer by shading from strong sun and syringings after hot days.

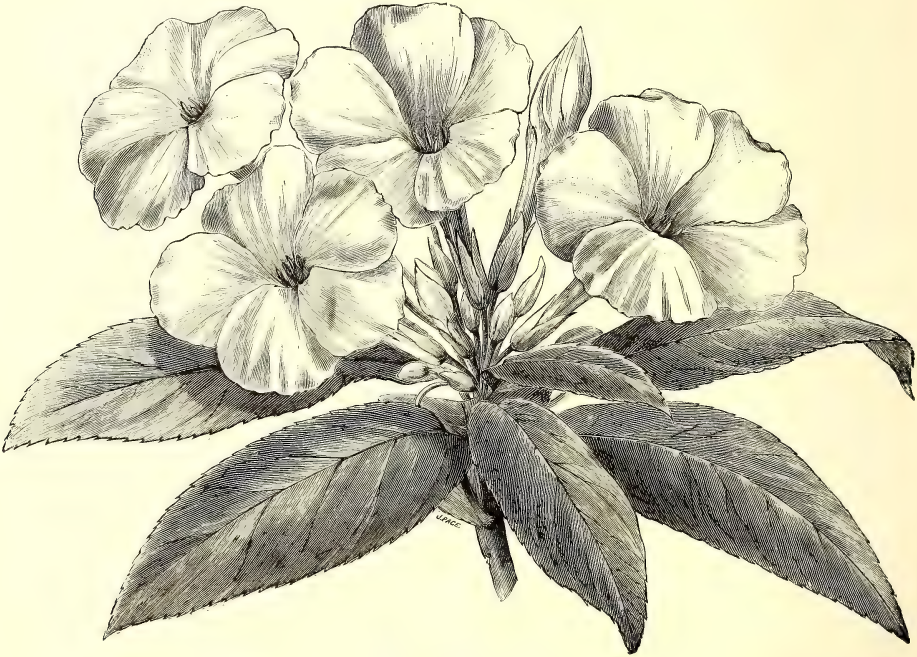

Fig. 97. Linum trigynum.

A shift may be given early in the summer to some of the stronger plants, or all may be planted out in frames or sheltered positions in common with bouvardias, taking them up and potting early in September. The soil that suits libonias is a mixture of two parts of good loam to one of leaf mould, with a little decayed manure and sand thrown in. One central stake and a few strips of raffia are all the supporting large plants require. Red spider must be kept down by summer syringings, as previously advised.

LINUM.—What is generally known as Linum trigynum (Fig. 97) is by botanical authorities termed Reinwardtia trigyna. It will here be treated upon under its popular name. L. trigynum is a native of the East Indies, and was at one time found in most collections of greenhouse shrubs. It is dwarf and bushy in habit, and in the late autumn and winter months, produces showy yellow flowers freely. Cuttings of young shoots in April, inserted in sandy soil, under a bell-glass or in a close frame with a temperature of 65° to 75°, emit roots freely. Place the young plants singly in small pots, and grow in gentle heat. Top to make them bushy, and when sufficiently advanced in growth, shift into larger pots. During the summer arrange the plants in frames, shading from bright sunshine and syringe them every morning and afternoon. Expose them to the full sunshine in the autumn; during the winter or flowering period, they succeed best in a temperature of 45° to 55°. Assist with liquid manure. In February, or early in March, prune the old plants rather severely, syringe daily to promote a healthy fresh start, and re-pot, partially reducing the old ball of soil, directly growth re-commences. Suitable soil for this and previous pottings consists of a mixture of two parts good fibrous loam to one each of peat and leaf soil, with silver sand added. Pot firmly. Subsequent culture should be the same as recommended for the young plants. Red spider, if allowed to gain the upper hand, quickly cripples the plants, hence the necessity for repeated syringings as a preventive. Vigorous young plants are the least affected by red spider, and a stock of these should be raised every spring to take the place of the older ones.

LOMATIA.—Representatives of this small family of greenhouse evergreen shrubs, from Australia, are grown principally for the elegance of their foliage. The species usually catalogued are L. elegantissima, L. ferruginea, and L. silaifolia. Propagation is effected by cuttings of well-ripened shoots, any time from June to September in sandy peat, covered with a bell-glass or in a glazed frame, and kept in a temperature of 60° to 70° till rooted. From small pots, in which the plants have been placed singly, gradually shift into larger sizes, that is if large plants are desired, as single-stemmed plants in 5-inch and 6-inch pots may be found the more serviceable. The soil suitable is a mixture of two parts of loam to one each of leaf soil and peat, with sand to insure porosity. During the summer the plants may be grown in cool pots and frames, at other times the warmest part of a greenhouse best suits them. Old plants may be pruned into good form in February.

LONICERA, see **CONSERVATORY CLIMBERS**.

Luculia.—A wall or pillar plant. For cultural instruction, see **Conservatories.**

MACKAYA.—This genus of greenhouse shrubs is represented by a single species only—M. bella, a native of Natal. If properly grown M. bella is very beautiful when covered with flowers, though more often than not the plants fail to flower satisfactorily owing to faulty treatment. Propagation is effected by cuttings of firm young shoots, inserted singly in 2-inch pots filled with sandy soil, and placed in a close frame till rooted. Top the young plants to make them branch, and shift into 5-inch pots. During the summer and early autumn months the plants may be grown in frames, ventilating freely and syringing daily. Winter them in a greenhouse, and give no more water than is needed to keep the wood from shrivelling. These young plants are not expected to flower, but should be cut back rather hard and started into active growth in April. When fresh growth is forming shift the plants into 8-inch pots, using a mixture of two parts of fibrous loam, broken up roughly, to one of flaky cow manure. If the plants make good progress under the treatment recommended for them, they will require to be shifted into 10-inch pots in the summer, and by the autumn will have developed into branching specimens from 2 feet to 3 feet high. They may be wintered in a temperature of 40° to 50°, and must be kept perfectly dry, all the leaves falling off. They should not be pruned before flowering. In March a warmer position may be given the plants, and they will then produce racemes of flowers from the points of all well-ripened shoots. Prune after flowering and treat as before. Two-year-old plants usually give the best results and a supply of young plants should be raised every season accordingly.

MAGNOLIA.—The only species recommended for greenhouse culture is M. fuscata. This is a native of China, and an evergreen shrub of a bushy habit of growth. The flowers are strongly scented, dull purple in colour, and produced in April. Plants are increased by layering in the summer or autumn. May be planted against greenhouse or conservatory wall, or kept in large pots or tubs. Suitable soil, a mixture of two parts sound loam to one of leaf soil or peat, with plenty of sharp sand added. Frequent potting is not necessary if strongly rooted plants are annually top-dressed and also supplied with weak liquid manure occasionally. Keep the foliage clean by syringing and sponging.

Mandevilla, see **Conservatory Climbers.**

Marguerites, see **Commercial Floriculture.**

MIGNONETTE.

Mignonette (Reseda ordorata) finds favour with most people, especially when flowered under glass at a time when no spikes can be had in the open. Pot culture is not such an easy matter as might be imagined. On the contrary mignonette requires skilful management—at all events if the plants and flowers are required in the most presentable condition. They are principally grown in 6-inch pots. Trained plants meet with less favour than formerly, but for the benefit of readers who would like to try their "prentice hands" upon trained specimens of mignonette, cultural hints are here given. The commoner varieties are not good enough for the purpose, and the best for growing either as standards or pyramids, are Miles' Spiral and Parsons' White. These cannot be grown to a large size in a few weeks, but at least six months ought to be expended in the production of plants that are to commence flowering under glass in October or a little later.

For producing them sow the seed late in April or early in May. Fill the requisite number of clean 3-inch pots with a mixture of two parts sandy loam to one of leaf soil, making this moderately firm. Sow about six seeds in each, cover with a little fine soil, and place in a shallow warm frame to germinate. When the seedlings are large enough to nearly touch each other, reduce to three in each pot, reserving those with the broadest leaves, as any with narrow leaves usually produce inferior flower spikes. Lightly support these plants, when they require it, with small stakes, ventilate freely and do not neglect the watering. When the pots are well filled, but not unduly crowded with roots, a shift must be given into the 5-inch size.

For this and subsequent pottings the soil suitable is a mixture of three parts loam to one each of leaf soil and partially-decayed manure, adding pounded mortar rubbish and silver sand freely, with a very light sprinkling of soot. Clean, carefully-drained pots must always be used, and the soil pressed down firmly.

Return the newly-potted plants to a frame or shallow pit, and if, during the summer, neither deep frames nor pits can be spared for trained mignonette plants, they must have the benefit of a sheltered position and an awning to screen them from drying winds and strong sunshine. For growing into standards the most promising of the reserved plants in each pot should be finally saved and the rest drawn out. Support the plants with a light stake and pick out the point of each plant directly it gives signs of flowering. Secure the strongest shoot that follows to take the lead, top the lower side shoots at the first joint, and do not remove these stem swellers till the winter. Whether the plants shall be grown to a height of 18 inches or 2 feet, must be left to the discretion of the grower; but before anything approaching a head can be formed by topping first the leader and then the growths that are to form the head, a shift into 8-inch pots must be given. It only remains to be added that an informal head can be had by frequent topping and merely securing the branches to a tall central stake with strips of raffia. If formal heads are desired, then must a wire hoop be fastened to cross stakes, and the branches drawn down and out to this, the upright growths resulting from these being trained in their turn to wires and threads connected with the high central stake and the hoops. Whether mignonette pays for all this trouble is a moot point, especially that it frequently takes two years to form a perfect head; still, when good "trees" are produced they are always admired.

Pyramidal-shaped plants can be grown more quickly. These again may be of formal or informal outline. What may be termed freely grown pyramids are the most generally serviceable and not difficult to produce. Sow seeds as advised for producing standards and at the same date. Select three well-placed plants and support them with a single central stake. If duly shifted into larger-sized pots, as required, the plants will grow strongly and branch naturally. Pinch out the points of the leaders as soon as they show flower-buds, and train the growth resulting immediately below to continue the lead. The side growths must also be topped as often as they show buds, and these will then branch freely. When the leading growths are from 12 to 15 inches high, top the two weaker and lay in no more upright shoots from these, the third stronger leader being sufficient to form a good centre. No training will be found necessary beyond lightly looping up the branches that require support to the central stake. These natural pyramids may be flowered in 9-inch or even larger pots. They ought to afford abundance of flower spikes through the winter and spring months, after which they should be thrown away.

Formally trained pyramids are usually developed from a single plant, and these may be kept in a presentable condition for several years, though they are at their best during the first and second seasons. In this instance, again, the start must be made early, and in the same manner as advised for standards. Select the plant most promising in appearance in each pot and remove the rest. When about 3 inches high all ought to be given their first shift, which may be into 5-inch pots, doing this important work carefully, breaking the roots of the plants as little as possible, and quite covering the old ball of soil with fresh compost. Support with a light straight stake and top each plant when about 6 inches high. Of the six or more shoots resulting from this topping, select the one best placed for continuing the lead, drawing the rest down to an horizontal position, and supporting them by small stakes till they extend far enough to reach the trellis upon which they are to be trained. Not till they have reached this limit should these lateral growths be topped, unless, owing to a check given at the roots they flower prematurely, in which case the point must be pinched out and a fresh back break laid in. Keep all side shoots removed from the stem till the trellis is reached, when the training to and covering of this will be a comparatively easy matter. It will be found that ultimate success largely depends upon laying a good foundation. In the meantime the central growth will have been topped and more horizontal shoots laid in. Continue these proceedings till a height of 18 inches to 2 feet has been reached. A second shift, this time into 8-inch pots, should be given before the plants become seriously root-bound, and the final shift, not later than the third week in August, may be into 10-inch pots.

After the final shift a stronger central stake painted green should be provided, and the trellis attached. A wire hoop 14 inches or rather more in diameter may be secured to cross stakes resting on the rims of the pots and properly fastened; by passing wires from this through a hole burnt in the top of the central stake, and down to the hoop on the other side, a simple and suitable trellis is formed. Train the shoots resulting from the ends of the horizontal growths thinly and evenly over the trellis, topping them only when flower buds show. The breaks from these trained shoots ought to be lightly tied to the trellis, and they will duly elongate and flower, say in November. These trained plants will continue to produce flowers till mignonette can be had in the garden, when they should be gradually hardened and arranged in the open air. Thin out the growths and keep all flowers closely pinched off the shoots till the following autumn, or near the time for housing them again. Those plants already in comparatively large pots should, early in the summer, have about one inch of the surface soil removed, and then receive a rich top-dressing containing a sprinkling of ground bones. Any that did not make sufficient progress the first season may be given a shift into 10-inch pots early in the summer. All ought to be shaded from strong sunshine, and syringing the plants on hot dry days acts beneficially.

The market growers' plan of cultivating mignonette, and which private gardeners and amateurs will do well to adopt, has yet to be described. In this instance several plants are grown together in a pot, each producing a single large spike of bloom. The variety known as Machet (Fig. 98) is the best for the purpose, but other improved large-flowering forms of a more branching habit are suitable if stems to be cut for bunching are most desired. The second or third week in August is the time to sow if the plants are wanted in flower before midwinter, another sowing in September affording a good succession. Fill well-drained 5-inch or 6-inch pots with a compost similar to that recommended for trained mignonette, not omitting the crushed mortar rubbish nor the sprinkling of soot. Make this solid, and level the surface. Sow good seeds thinly, or from twelve to fifteen in each pot, and cover lightly with fine soil. Arrange the pots on ashes in a cold frame or shallow pit, give a gentle watering, and shade the frame heavily till the seedlings appear. Subsequently shade lightly during the hottest part of the day only, and admit air freely. Thin out the seedlings before they become crowded, leaving about five in the smaller-sized pots and seven in the 6-inch size. After September a light greenhouse stage or a hanging shelf is the best position for the plants. If grown as sturdily as they ought to be, very little support will be required. If needful, place a short light hazel stake to each plant, or stakes may be placed round the sides of the pots, and strips of raffia passed round the plants. The flower spikes will be increased in size if the side growths that form immediately below them are early pinched out. If a number of the pots are arranged either on a firm

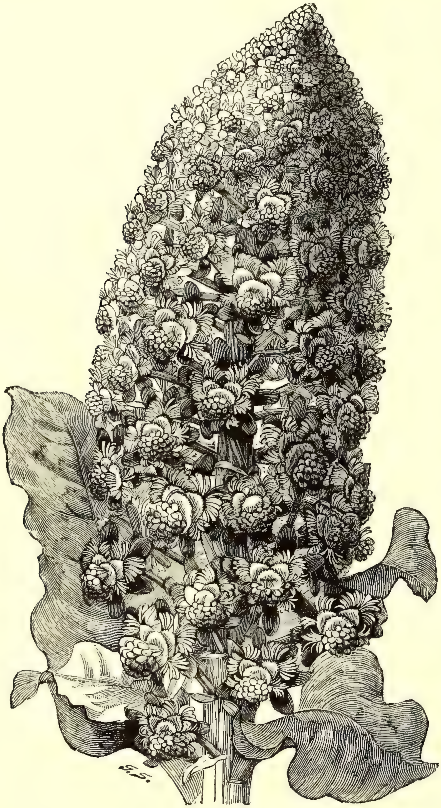

Fig. 98. Mignonette Machet.

light border or a bed of ashes in February, and the plants allowed to root through into this, they will grow strongly, branch freely, and produce a bountiful supply of spikes for cutting. The later-raised plants should be at their best in the spring.

Mignonette generally requires close attention. Allowing the plants to become very dry at the roots gives them a severe check, and exposure to drying winds also has an hardening effect upon their growth. While quite young, shallow frames facing the west afford the best position for them. The leaves ought to present a rich green succulent appearance, and not look pinched and bluish green. Never turn a plant out of its pot with a view to giving a larger one before seeing if the soil is dry. The plants must be in a moist state at the roots when re-potted. After re-potting water ought not to be applied to the soil for three or four days, but the frames should be kept rather close, the plants syringed twice daily, and light shading afforded. When the new soil is well occupied by roots abundance of water will be needed, and clear soot water should be given once a week, at least, after the plants have become strongly established in their flowering pots. An occasional light surfacing of crushed saltpetre, or special plant manure, may be given with advantage to specimen plants.

During the late autumn and winter months mignonette must have a light airy position in a cool greenhouse. Mixing the plants among a variety of other kinds, unless raised well above them, causes weakly growth. All old seed pods ought to be pinched off as fast as they form, and everything possible done to keep the plants in good health.

MIMOSA.—Of this large genus two species are principally grown, and this on account of their sensitiveness, the leaves closing and drooping directly they are touched. M. pudica and M. sensitiva are both "Sensitive Plants," and for greenhouse culture should be treated as annuals. Sow seed in light soil, in brisk heat, in February or March. From 2-inch pots, in which each plant is first placed, shift into 5-inch pots, using a mixture of two parts sandy loam to one of leaf soil. Assign them a light position not far from the glass, and keep well supplied with water. The plants should not be topped.

MITRARIA.—M. coccinea, the Mitre Flower, is a half-hardy trailing evergreen that succeeds well in a cool greenhouse, and produces bright scarlet flowers freely from May to July. It may be increased during the summer by division in April, or by cuttings in light sandy soil, in a close, cool frame. The pots used for this plant should be carefully drained, and the soil suitable is fibrous peat, with abundance of sand, for Mitrarias thrive in shady positions in a cool greenhouse or fernery.

MYRSIPHYLLUM.—Under the popular name of "Smilax," M. aspargoides is extensively grown by both private and market gardeners. The long elegant and durable trailing growths it produces are greatly esteemed for dinner-table decoration and other purposes. The stock can be increased by cuttings in heat in the spring, or by division of the roots, but seedlings develop into the most profitable plants, and are easily raised. Sow in pans of light sandy soil in February or March, in a temperature of about 65°, to germinate. Move the seedlings singly into 2½-inch pots, and return to gentle heat for a few weeks. From these small pots they may either be transferred to the 6-inch size, or, better still, planted in narrow borders against the back walls or ends of greenhouses or vineries. The plants are not fastidious as to soil, but may have a mixture of two parts sandy loam to one part each of leaf soil and decayed manure. After they are well established, they should have water freely and liquid manure twice a week. Unless the training is well attended to, the young growths soon become inextricably confused, this rendering them comparatively valueless for decorative purposes. Each growth should have a length of thin string to itself, round which it will twine. When wanted for use the string may be cut with the growth, and drawn clear of it without injury to the leaves. The flowers are insignificant in appearance, but sweet-scented. Seed can be saved, and sown as soon as ripe. Syringe growing plants daily, and if this fails to keep the foliage free of aphides or thrips, these must be destroyed by tobacco smoke or nicotine fumes, otherwise "Smilax" will be quickly disfigured.

MYRTUS.—The Common Myrtle, M. communis, is the most popular species belonging to this family, more as a matter of sentiment though, than for its intrinsic worth. "Sprigs of Myrtle" from bridal bouquets of members of the Royal Family are rooted, and the plants preserved, to commemorate those happy events. Its natural habitat is the South of Europe, and well-grown bushes flower freely in June, and later. Angustifolia, flore pleno, Jenny Reitenbach, latifolia, and latifolia foliis variegata are desirable varieties of M. communis. M. Ugni, also known as Eugenia Ugni, produces flowers in May, followed by small glossy reddish-black fruit, which are pleasantly scented and eatable. Myrtles can be raised from seed in a temperature of 65° to 75°.

Seedlings ought first to be established in small pots, and topped to make them bushy, giving a shift soon afterwards. Cuttings made from firm young shoots two to three inches long, inserted in sandy soil, in the early summer months, and covered with glass, will produce roots in an ordinary greenhouse temperature. It is also possible to root small branches in bottles of water. Treat plants propagated by cuttings similarly to seedlings, unless standards are required, in which case there should be no topping till the required height is reached, but all side-shoots ought to be removed as fast as they form. When a good head or bush is formed, cease topping and allow the shoots to develop and branch freely. Myrtles should be arranged on a bed of ashes in the open during the summer, and a cool greenhouse or conservatory is the best place for them in the winter. In February trim the heads into the desired form, and soon afterwards those in want of larger pots should have them. They suffer if allowed to become dry at the roots at any time, and that is the reason why myrtles succeed better in small tubs than in pots. Any plants or shrubs which cannot well be shifted into larger pots or tubs, may have the old soil and roots freely reduced, this admitting of their being returned to the same-sized receptacles they were in before. In each and every instance the soil used may consist of two parts sandy loam to one of leaf soil, potting firmly as a preventive of rank non-flowering growth. For similar reasons neither liquid manure nor manurial top-dressings should be applied to plants other than those giving signs of requiring extra assistance. Syringe them frequently to keep the foliage clean, and if thrips show on the bushes after they are housed in October, either syringe with a solution of soft soap and tobacco water, or subject them to tobacco or nicotine fumes.

NERINE.

This genus of South African bulbous-rooted plants is very nearly allied to the Amaryllis family, and the best of the species are well worthy of inclusion in quite a limited collection of greenhouse plants. N. curvifolia, better known as N. Fothergilli, is remarkably showy, producing large umbels of bright scarlet flowers, on scapes about 10 inches long, at various seasons. There is an improved form of this, generally catalogued as N. Fothergilli major (Fig. 99, next page). N. flexuosa bears some resemblance to it, but the flowers are a vivid crimson-scarlet. N. sarniensis, or The Guernsey Lily, produces bright orange-scarlet flowers, on a scape 2 feet high, in the autumn. An improved form, known as N. s. corusca major, produces larger flowers, as many as thirty of these forming on a scape. N. undulata is more floriferous than the rest. The flowers are flesh colour, or light pink, and borne on a scape 1 foot high, usually in May.

Nerines may be raised from seeds, similarly to Amaryllises (p. 287, Vol. I.), and are propagated by offsets when the bulbs are re-potted, treating these similarly to flowering bulbs. Re-potting annually is not good practice. Once in three years, or when the bulbs are getting crowded, is often enough, and the best time to re-pot is from August to November. The soil recommended is a mixture of three parts sandy loam to one each of leaf soil and decayed cow manure in a crumbled state, with abundance of sharp

Fig. 99. Nerine Fothergilli major.

sand. Three large bulbs, or five medium-sized ones, may be placed in each well-drained 6-inch pot, and they should be about half buried. While top growth is progressing gentle bottom heat is of good service, and the plants ought to be kept well supplied with water. Those not re-potted should have the surface soil removed, and receive a top-dressing of sandy loam and manure, also abundance of water and liquid manure during the growing season.

When growth ceases, gradually withhold water, and during the summer keep them out-doors in a dry state, in the full sunshine. After this thorough ripening and rest, pots of bulbs, in succession, may be given a good watering and then started into growth, the autumn and winter flowering species soon showing their flower heads. Neglecting to do all that is possible to promote a strong leafage during the growing season, drying them off prematurely, and failing to ripen the bulbs thoroughly after their growth has been completed are common errors, and should be avoided by all would-be successful growers of Nerines. Their growing season is from September to May, and most of the species flower either in advance of leaf growth, or just when the leaves are appearing. They have a beautiful effect arranged among maidenhair ferns.

NERIUM.

What are popularly known as Oleanders are, strictly speaking, Neriums, or varieties of Nerium Oleander (Fig. 100, next page). The original species is a native of the Mediterranean region, and has long been cultivated in this country. Although not quite so much appreciated as of old, Neriums must yet be considered to rank among the handsomest of large greenhouse and conservatory plants. In all probability few gardeners are aware how very poisonous the wood, leaves, and flowers of this old favourite really are. They have proved fatal to animals, as well as to members of the human race, but with ordinary care no ill results should attend the cultivation of Neriums.

Propagation is effected by simply taking off branchlets or firm young shoots, and after removing the lower leaves, inserting the stems in bottles of rain water containing also a few pieces of charcoal. These bottles may be kept in gentle heat, or a greenhouse, and all that is further necessary is to keep the bottles filled with water, and to watch progress. When well rooted these plants should be treated similarly to those raised from cuttings, inserted in pots of sandy soil under a close frame. All should be placed singly in 2½-inch pots and returned to a warm corner in a greenhouse or frame.

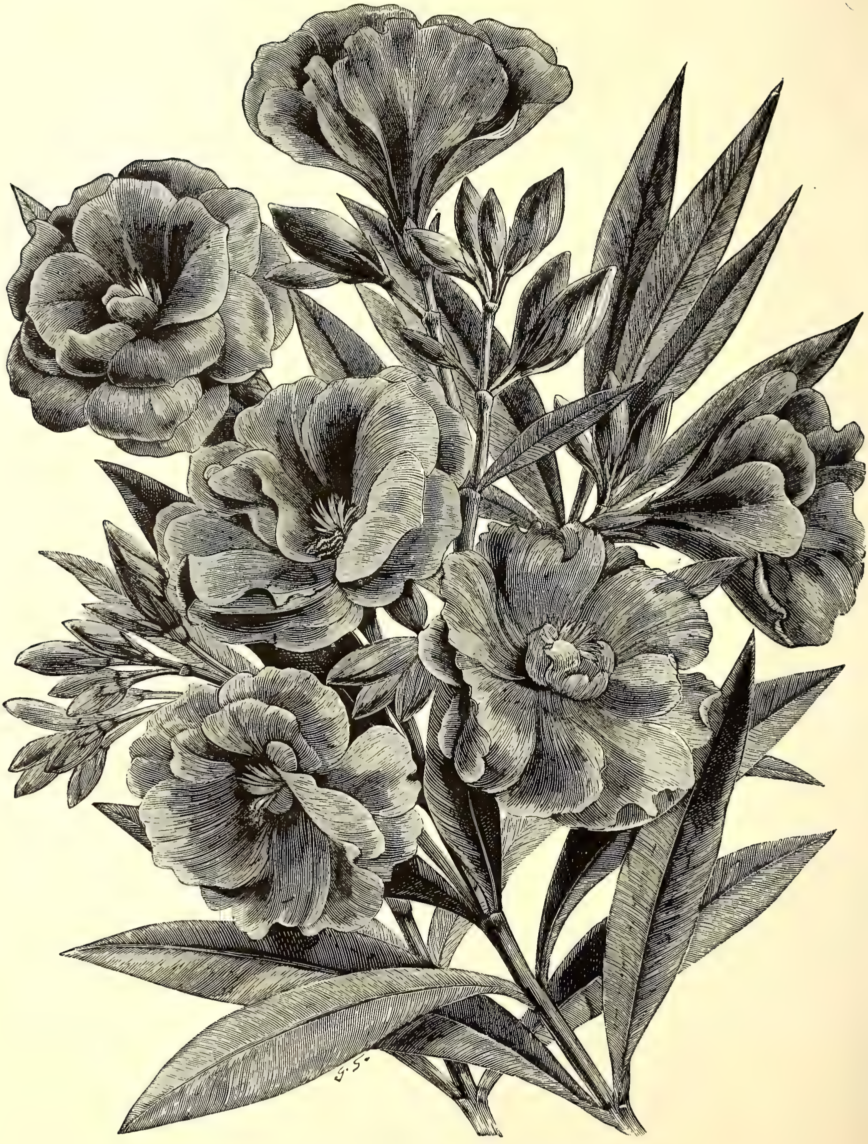

Fig. 100. NERIUM OLEANDER SPLENDENS.

According as the pots become well filled with roots, shift into larger sizes. The compost suitable throughout is a mixture of two parts loam to one each of leaf soil, decayed manure, and sand. Pot firmly. Expose the young plants to the full sunshine and air, and if they have made good progress they ought to flower strongly the following June.

After flowering, give less water for a few days, and then cut them down to within 6 inches of the soil. A little extra warmth, with moisture in the atmosphere, will cause them to start into growth quickly and strongly, and they should be assigned a light position in the greenhouse during the autumn and winter. In February all that require more root room should have larger pots, and the strong growth resulting will, if well exposed to the sun, flower later in the season. Bushy plants in large pots or tubs are well adapted for arranging on terraces, along sunny approaches to a dwelling-house, or in fronts of conservatories. They must have water in abundance, varied with liquid manure in the case of root-bound plants, from March to September, and the soil in the pots or tubs should never become very dry at any other period of the year. Young shoots forming just below the flower trusses should be early removed. Non-attention to this detail and also starving the plants at the roots frequently end in dropping of the flower buds. Old plants, unless cut down each year after flowering, become tall and straggling, in which state they are neither so ornamental nor so floriferous as those kept better furnished with strong young growths.

Varieties of Nerium Oleander.

ALBUM PLENUM.—Flowers white and large, with double corolla.
CUPREATUM.—Flowers copper-coloured, large, single.
Felix Bourguet.—Flowers pale saffron, single, very floriferous.
Henri Mares.—Flowers a beautiful rosy pink, corolla double.
Madonna grandiflorum.—Flowers creamy white, large, double.
Mons. Balaguier.—Flowers pale pink, large and showy.
Paulin Gregoire.—Flowers bright rose colour, large, single.
Professor Duchartre.—Flowers deep rosy purple, double, distinct.
Rose Double.—Flowers bright rose, double, large.
Sœur Agnes.—Flowers pure white, single, and pretty.
Souvenir du Felix Dunal.—Flower bright rose, double, very fine.
SPLENDENS.—Flowers bright red, double (Fig. 100).
VARIEGATUM.—Flowers red, leaves edged with white and yellow.

OPHIOPOGON.—This genus was originally introduced from Eastern Asia, and the plants classed as hardy or half-hardy perennials. The variegated forms, however, are to be seen at their best under pot culture, and are worthy of inclusion in a small collection of greenhouse plants. O. Jaburan argenteo-variegatus has narrow recurving leaves prettily striped with green and creamy white, and produces small spikes of blue flowers freely during the summer. O. japonicus aureo-variegatus, commonly termed O. spicatus, has elegant leaves striped with green and yellow, and also produces small spikes of blue flowers in the summer. They are increased by division in the spring, and may be potted in a mixture of three parts loam to one each of leaf soil, fine well-decayed manure, and sand. They are the most serviceable for house and conservatory decoration in 5-inch pots and may be cultivated in frames, greenhouses or windows.

ORANGES.—See CONSERVATORIES.

PASSIFLORA.—See CONSERVATORY CLIMBERS.

PHÆNOCOMA.—This small family is represented by a single species, P. prolifera, and its deeper-coloured variety, Barnesi. It is rarely met with in greenhouses nowadays, but a few extra fine specimens are exhibited at some of the leading horticultural exhibitions every summer. It is of a somewhat loose habit of growth, with small, glabrous leaves, flowers crimson in colour, not unlike an Helichrysum in form and of the same "everlasting" character. It is somewhat difficult to propagate. Cuttings of young side shoots getting firm at the base are inserted in silver sand on the peat, and placed in gentle heat. From quite small pots, the young plants should be slowly shifted into larger sizes, using a mixture of hard and soft peat with a little charcoal and abundance of sand. Pot firmly. During the summer, the plants may be grown in a cool, shallow pit, taking care to exclude worms from the pots and also to admit air freely. During the colder part of the year a light staging not far from the glass, in an airy greenhouse, is the proper position for them. Train the young plants to induce them to branch freely. The watering must be done in the same careful manner as recommended for Ericas and other hard-wooded plants.

PHILAGERIA.—This genus originated in this country and was the result of a cross between Philesia buxifolia and Lapageria. It is a slender shrub and in habit of growth more nearly resembles a lapageria than anything else, while the flowers partake more nearly of the character of Philesia buxifolia. Unfortunately it is shy flowering and is therefore not much cultivated. Should be grown in peaty soil and a moist cool house.

PHILESIA.—P. buxifolia (Fig. 101), Chili, is a greenhouse shrub that branches freely and produces flowers red in colour and resembling a lapageria, only they are smaller. Suckers are freely produced by strong plants, and the stock may be increased by division. The compost suitable is a mixture of equal parts of loam and peat, with sharp sand added. During the warmest part of the year the plants should have abundance of water, and weak liquid manure benefits those that have not recently been re-potted. Prune after flowering. It is half hardy and may be wintered in a cool greenhouse.

PHORMIUM.—P. tenax, or the common New Zealand Flax and its varieties atro-purpureum, nigro-pictum, variegatum, and Veitchianum are frequently utilised with good effect in the sub-tropical garden during the summer, and for greenhouse and conservatory decoration during the rest of the year. They may be raised from seeds sown in a pan, and placed in a cool greenhouse or frame to germinate. Propagation is usually

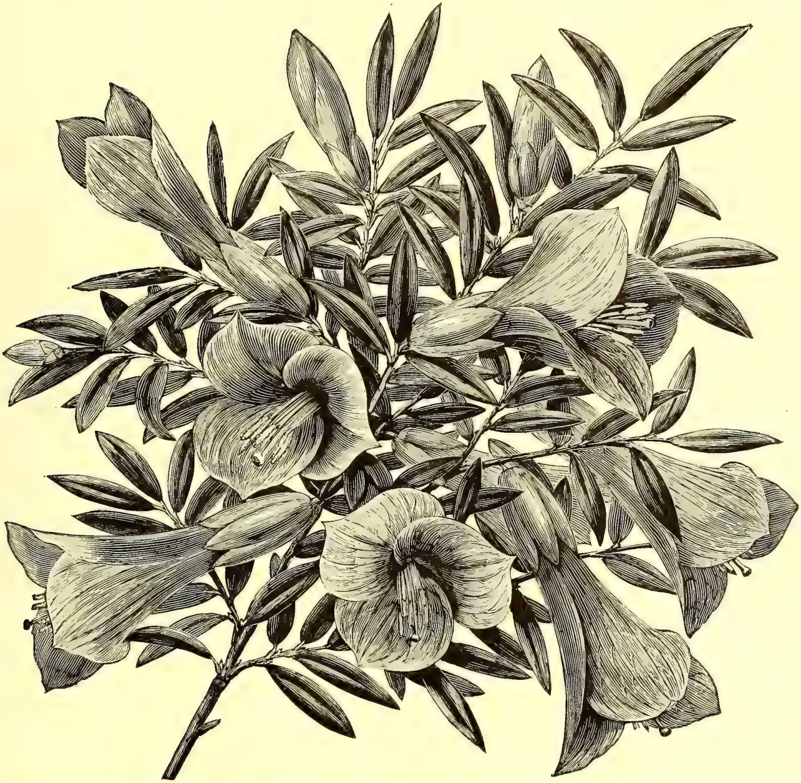

Fig. 101. PHILESIA BUXIFOLIA.

effected by division of the roots in March or April. Large plants thrive best in tubs, and all should have a rich loamy soil. From April to October well-established plants must have abundance of water, and ought not to be allowed to become very dry at the roots during the rest of the year.

PHYSIANTHUS.—Of this small family two species are recommended as being desirable additions to the list of climbing plants: P. albens, or White Bladder Flower (Arauja albens), Brazil, flowers white slightly tinged with red, July; and P. graveolens, better known as Schubertia graveolens, Brazil, flowers stephanotis-like, only larger and strongly scented, July. The first named will succeed well in a cool greenhouse, but P. graveolens ought to be assigned warmer quarters. Seed sown in March, in pots or pans of light sandy soil, and placed in a temperature of 65° to 70°, will germinate freely, but propagation is more often effected by cuttings of short, sturdy side-shoots, inserted in sandy peat soil, in a frame over a gentle hot-bed in the spring. When well rooted place the young plants singly in 2½-inch pots, and give them the benefit of moist, gentle heat till they are well established. They must be early shifted into well-drained 6-inch pots, and from these again, when strong enough, into 8-inch or 9-inch pots. A suitable soil mixture consists of equal parts of fibrous loam and peat, with a little sharp sand; for the larger sizes break up the loam and peat somewhat coarsely, and in every case afford ample drainage, as the plants require abundance of water when well rooted, and this must pass away freely. Training the young plants round a few stakes will cause them to branch strongly. P. albens is usually trained up greenhouse pillars, but P. graveolens may be flowered on a globular trellis for exhibition purposes, similarly to Stephanotis floribunda. In addition to receiving abundance of water, taking care, however, not to saturate the soil soon after re-potting has taken place, the plants ought also to be syringed daily till they are in flower. After flowering apply only enough water to keep the wood plump and fresh. Prune lightly in February or March, and the strong resulting growths should flower freely in due course.

PIMELEA.—Yet another family of hard-wooded greenhouse plants that have largely been ousted out of general cultivation by a variety of more showy soft-wooded kinds. The pimelias that will be named are deserving of a better fate. They are by no means difficult to grow and flower, and moderately large specimens present an attractive appearance in May or June. P. ferruginea (syn. decussata and diosmæfolia) produces flowers in dense heads, colour rose or red; P. rosea (syn. Hendersoni) differs from the preceding in the colour of its flowers only, which are pinkish white; and P. spectabilis, a species which may be said to be the best of the family, produces large globular flower heads, colour white, tinged with pink; while P. spectabilis rosea is a richer coloured variety. If seeds can be procured of these Australian and New Zealand shrubs, they should be sown in pots or pans of sandy soil early in the spring, covering lightly with fine soil, and placed in a temperature of 55° to 65° to germinate. Cuttings of young shoots 2 inches long, inserted in sandy peat, covered with a bell-glass, or placed in a close frame, will root freely in a temperature of 55° to 65°. After hardening slightly, place the young plants singly in 2-inch pots and peaty soil, keeping them moderately warm and close till fresh roots are formed, when they may be moved to a greenhouse shelf. Top the plants to make them branch freely, and soon after give a small shift, which will allow pot-room enough for the first season. Top the growths in the following spring, and if they break strongly, a shift into 7-inch pots may be desirable. One more topping and good-sized bushes, capable of flowering profusely the following May, should result. An airy greenhouse is the best place to keep them in during the greater part of the year, but a month or two in cold pits after the young growth is well matured will not harm them. Pimeleas should be freely cut down after flowering, and be kept in a rather close and moist atmosphere till they recommence growth, when any re-potting that may be necessary should be attended to. Three parts of fibrous peat to one part of fibrous loam, adding half a part of silver sand, form a suitable compost. Always drain the pots carefully, and pot firmly. While the plants are forming fresh growth after pruning, and which, be it remembered, is to flower the following year, syringe daily, and when arranged outside with other hard-wooded plants, they should be syringed frequently in hot

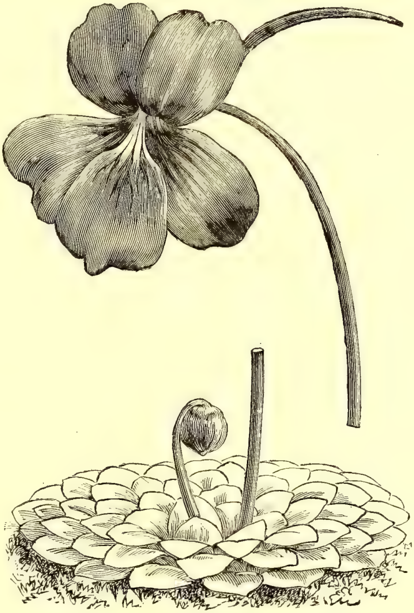

Fig. 102. Pinguicula caudata. (Next page.)

weather, with a view to keeping down red spider—an insect pest that pimeleas are liable to be attacked by. Watering must be carefully applied both during the summer and after the plants are housed. An excess of it will sour the soil and ruin the plants; while if the soil is allowed to become very dry most of the root-fibres will perish and the plant also probably.

PINGUICULA.—Of this small family of "Butterworts" the best for greenhouse culture is P. caudata (syn. Bakeriana) (Fig. 102), a Mexican species, and very beautiful. It is a perennial of a neat, dense growth, and produces rich, deep carmine flowers in the autumn. Plants are raised from seeds sown in February or March, on the surface of shallow pans filled with equal parts of sphagnum moss, peat and sand, placed under a bell-glass and kept constantly moist in a temperature of 55° to 65°. May be increased by division in March or April. It is at this season of the year when re-potting may be done. The compost that suits these plants is equal parts of peat, sphagnum moss, and clean crocks, and the pots used must be heavily drained. After potting arrange the plants on inverted pots in saucers of water, and cover with a hand-light or bell-glass. In these they should be constantly kept, only admitting air for a few minutes every day. Shade from bright sunshine. Water freely during the warmest part of the year, when a cool position suits the plants, but they ought to be kent at the warmest end of the greenhouse through the winter.

PITTOSPORUM.—Only a very limited number of species belonging to this large family are cultivated in greenhouses or conservatories, and these not generally. P. Tobira, a half-hardy evergreen shrub, produces terminal heads of white, sweet-scented flowers from March to August, and of this there is a variety with variegated foliage. P. undulatum, Australia, is somewhat shy flowering, but is of fairly ornamental appearance at all times. P. viridiflorum, Cape of Good Hope, has greenish-yellow, jasmine-scented flowers, which are usually at their best in May. All are propagated by cuttings of moderately firm young shoots, about 3 inches long, inserted singly in small pots and sandy soil, under a hand-glass in shade and a temperature of 55° to 65°. Gradually shift the plants into larger pots, using a mixture of two parts fibrous loam to one of peat or leaf soil, with sand added. Allow the plants to branch naturally. They may be arranged in the open during the summer, and wintered in a cool greenhouse or conservatory.

PLEROMA.—See WALL AND PILLAR PLANTS (CONSERVATORIES).

PLUMBAGO.—See WALL AND PILLAR PLANTS.

POLYGALA.—What few species there are of this genus suitable for greenhouse culture are not popular, as they are not showy enough to gratify the tastes of the present generation of gardeners. The best are P. myrtifolia grandiflora, a much-branched, purple-flowered species from South Africa (syn. Dalmaisiana), and P. oppositifolia, a Cape shrub with purplish flowers, which, in common with the preceding, are freely produced in the spring. Cuttings of young shoots taken off the old plants in the spring, inserted in small pots of sandy peat, and placed under a frame or bell-glass in a temperature of 55° to 60°, root freely. Top the young plants to make them bushy, afterwards allowing them to branch naturally, pruning irregular shoots in February. Re-pot in February or March, using a mixture of fibrous peat and sand. Pot firmly. The plants may be arranged in the open with other hard-wooded plants during the summer, an airy greenhouse suiting them at all other times.

RHODOCHITON.—R. volubile, a climbing greenhouse herb, with reddish-purple flowers, produced freely in the summer; is a good companion for Maurandya Barclayana, requiring very similar treatment. Sow the seeds in March, in light sandy soil and gentle heat. Place the seedlings singly in small pots, and grow them in a warm frame till well established. Before they become ckecked in growth, shift into larger pots or plant out against walls or pillars of greenhouses and conservatories. They succeed well in loam, leaf soil, decayed manure and sand. Thin out and shorten the shoots of old plants in February, when more pot room may be given.

RHODODENDRON.

What are known as greenhouse rhododendrons are a most desirable class of plants, and when well grown would never fail to be appreciated. Many of them are amenable to formal training, similar to the illustration (Fig. 103), kindly supplied by Messrs. J. Veitch & Sons, Limited. They belong principally to the Malayanum, Multicolor, Javanicum and Jasminiflorum groups (Fig. 104), with numerous hybrids raised by crossing these different sections. The majority are very beautiful, some of them sweetly scented, and altogether distinct in habit of growth and flowering from the ordinary hardy rhododendrons. Grand specimens are sometimes met with at the early summer shows, and as warm conservatory plants they are most valuable. Only a few, if any of them, succeed really well in a cool greenhouse, a temperature intermediate between that of a greenhouse and a mixed plant stove, or hot-house, suiting them best.

These rhododendrons can be raised from seed and increased by cuttings, layering, or grafting. The seed is small, and more than ordinary care has to be exercised to induce successful germination. Fill well-drained pots or shallow pans with fine sandy peat, surfacing with a layer of very finely sifted peat and sand, making smooth and firm. Give a gentle watering, a few hours later sowing the seed, pressing it in and covering very lightly with silver sand. Place in moist, gentle heat, cover with squares of glass, and shade heavily. The soil must be kept constantly moist by means of partial immersion of the pot in a tub or tank of tepid water, rather than risk disturbing the seed by applying water to the surface of the soil. When the seedlings appear, gradually expose them to the light and air. Immediately they are large enough to move, take up carefully and insert an inch or two apart, in pans of soil prepared as for seed-sowing, and keep them close, warm, and shaded, till well established, when more light and air are necessary. From the pans move the young freely growing plants into small pots, and return them to warmer quarters for a time, subsequently keeping them growing in gentle heat.

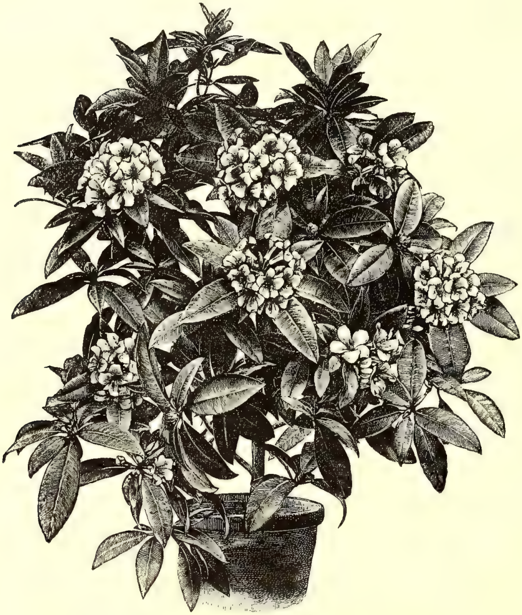

Fig. 103. Rhododendron.—Souvenir de J. H. Mangles.

Cuttings should be made of firm young shoots, inserted in sandy peat, and kept close and shaded in a temperature of 45° to 55°, till they have callused, when an increase of 10° will hasten root formation. These rhododendrons may also be layered successfully. In either September or March, select well-placed young firm wood, notch this at places, and peg down firmly in a bed of sandy peat. Roots will form slowly at the notched, buried parts, and not till they are somewhat plentiful ought the layered portion to be detached from the parent plants, and placed in pots. The layering must be done under glass, and the newly-detached plants should have the benefit of gentle heat and shade till well established in pots. In nurseries the greater portion of greenhouse rhododendrons are increased by grafting firm, young wood on healthy seedling stocks of common varieties. This is done in March in much the same manner as described and shown in the case of grafting Indian azaleas. See page 152. They should be kept warm, close, and shaded from sunshine till the union has taken place.

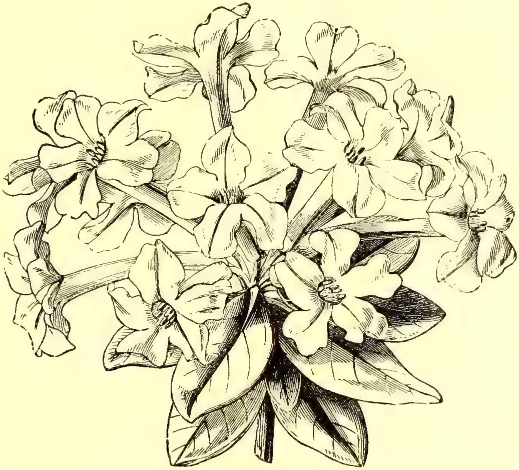
Fig. 104. Rhododendron jasminiflorum.

These rhododendrons, without being difficult to cultivate, are yet very easily ruined. Over-potting is a frequent cultural error. Not till the young plants have well filled their pots with roots ought a small shift to be given, while the larger flowering plants, if in good health, need only be re-potted every third year, and then given a small shift. April and May is the best time to re-pot, and the soil suitable is the best fibrous peat procurable, and silver sand freely mixed with it. Pot firmly, taking care to well and evenly pack the soil round the sides with the aid of a thin potting-stick. Large plants succeed well in medium-sized tubs. In all cases where the soil has been soured—the result of over-potting, over-watering, or the presence of worms in the pots—all the unoccupied soil should be carefully picked from the roots, and the plants then placed in pots just large enough to hold them. Clean, carefully-drained pots ought always to be used. Newly-potted plants should be kept in a moist atmosphere and gentle heat till they have rooted into the new soil. After flowering, irregular growths may be shortened, all seed pods must be promptly removed, and the plants given more heat, accompanied by daily syringings till their growth is completed.

The common mistake of placing them in the open air after flowering, must be avoided

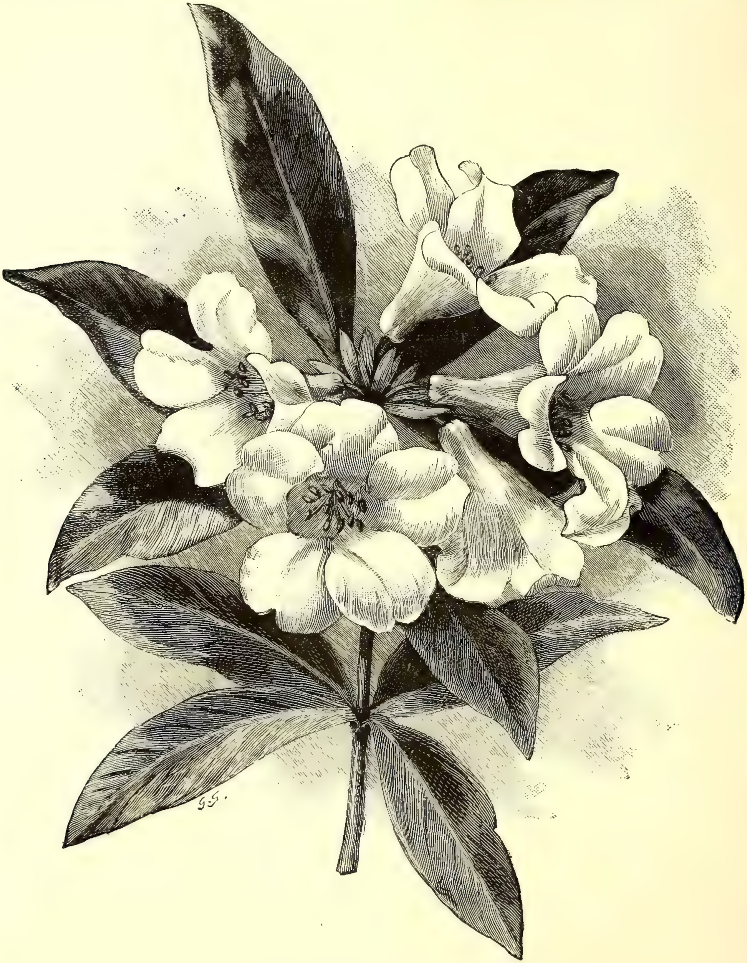

Fig. 105. Rhododendron Mrs. Heal.
(From the *Journal of Horticulture.*)

by all who would be uniformly successful with these beautiful rhododendrons. It is in the open where they are liable to get too much water, and to have the soil soured by worms. After their growth is completed, arrange the plants in a light, airy greenhouse, and keep them well attended to in syringing and watering. A winter temperature of 45° to 50° suits most of the varieties, a slight increase forwarding their flowering. Rain-water, or water softened by exposure in open tanks, ought always to be used, either soil or water containing lime proving most injurious to rhododendrons. Clear soot-water may be applied to strongly-rooted plants, after their buds are set, with advantage

VARIETIES OF GREENHOUSE RHODODENDRONS.

Some of the more delicate and early flowering, stiff-growing species and varieties, notably R. arboreum, and its progeny, including R. altaclerense, Russellianum, Smithi, and Veitchianum, together with Nuttalli, Edgeworthi, and Aucklandi, are admirably adapted for greenhouse culture, and will succeed in lower temperatures than the Jasminiflorum (page 225), Javanicum, Multicolor and Malayan groups. By crossing and re-crossing those four groups last named, Messrs. James Veitch and Sons, Chelsea, have been most successful in raising and introducing many beautiful novelties among greenhouse rhododendrons, and it is from their plant catalogue that the list, with descriptions appended below, are taken.

Javanico-Jasminiflorum Hybrids.

Ajax, bright orange-red, toned with tawny yellow.

amabile, delicate pale flesh-tinted, with rose; flowers 2½ inches in diameter, with short broad tubes.

Aphrodite, blush-pink, suffused with white. A beautiful variety; the flowers become almost white after being expanded a few days.

Apollo, deep orange-red, large globular truss; plant vigorous, with handsome foliage.

Baroness Henry Schröder, the finest of the light varieties of this group; delicate blush-white.

Brilliant, brilliant scarlet, the finest of its colour yet raised; bold globular trusses of well-formed flowers.

Ceres, a primary hybrid from R. javanicum and R. Teysmani; flowers of a uniform bright tawny yellow.

Conqueror, brilliant vermilion-red, shaded with orange, paler in the centre; bright and effective.

Diadem, bright orange-scarlet, tinted with carmine.

Duchess of Connaught, bright vermilion-red, well coloured throughout; compact truss.

Empress, bright salmon rose; the flowers among the largest in the section.

Favourite, light satiny-rose, with white tube and crimson filaments; a beautiful variety, large compact truss.

Hercules, a superb variety, having the largest truss with the largest flowers in the group; bright fawn-yellow, toned with rose-pink.

Imogene, a uniformly light buff-yellow.

jasminiflorum (species), white, with pink eye; very delicate and beautiful. (Page 224.)

jasminiflorum carminatum (hybrid), resembles the species in form, but differs in colour, which is rich carmine, with a faint shade of orange-scarlet.

Lord Wolseley, an improvement on the species.

javanicum (species) should be preferred to it; bright orange-yellow, tinted with rose towards the margin.

luteo roseum, satiny-rose, suffused with white, the centre toned with light yellow. One of the best; the flowers are more than 2 inches in diameter, and are produced in massive globose trusses.

Maiden's Blush, white, suffused with pale rose, yellowish eye; one of the best of the earlier crosses.

MINERVA, soft nankeen-yellow, with rose-pink filaments; plants vigorous, with dark green foliage; trusses massive, extra large, globose in outline.

MONARCH, buff-yellow, shaded with orange, filaments deep rose; tube very short, and the flowers well formed and enduring.

NE PLUS ULTRA, of a uniform crimson-scarlet; one of the finest of its colour.

OPHELIA, soft light rose, toned with light orange-yellow; distinct colour, large compact truss.

PRESIDENT, clear buff-yellow, tinted with rose, compact habit, and ample foliage.

PRIMROSE, the purest primrose yellow in the section.

PRINCESS ALEXANDRA, white, tinged with blush; still one of the best of its colour.

PRINCESS BEATRICE, light yellow, suffused with pink, light pink centre; vigorous and free flowering.

PRINCESS FREDERICA, light buff-yellow, tinged with rose at the margin; anthers bright crimson.

PRINCESS ROYAL, light rose-pink, with darker centre.

PURITY, a beautiful white variety, very free flowering.

ROSE PERFECTION, light satiny-rose, suffused with white.

SCARLET CROWN, brilliant orange-scarlet, flowers of good form and substance.

SOUVENIR DE J. H. MANGLES, orange-yellow, suffused with rose-pink; large well-formed flowers; truss bold and compact. (See woodcut, page 224.)

SYBIL, beautiful rose-pink, suffused with white; vigorous habit and neat foliage.

TAYLORI, bright pink, with white tube; plant of good habit and free flowering.

THETIS, light tawny-yellow, faintly tinted with rose.

TRIUMPHANS, crimson-scarlet. A splendid variety of very fine form, distinct and brilliant in colour; plant vigorous.

VIRGIL, clear buff-yellow, tinted with rose in the centre.

Valuable and later additions to the list resulting from second crosses are:—

LATONA, pure cream yellow, flowers 2 inches in diameter; plant vigorous.

LITTLE BEAUTY, glowing carmine-scarlet; plant dwarf, bushy, and floriferous.

MRS. HEAL, purest white, flowers 2 inches in diameter, small trusses. (See woodcut, page 226.)

NEPTUNE, brilliant scarlet, good trusses; plant dwarf and bushy.

NUMA, bright orange-red, trusses compact and globose; plant distinct in appearance.

RUBY, dark coral-red, toned with crimson; compact trusses.

DOUBLE-FLOWERED SECTION. R. BALSAMINÆFLORUM.

BALSAMINÆFLORUM ALBUM, white flowers, produced in large compact trusses, the largest of the forms with double flowers.

,, AUREUM, bright yellow.

BALSAMINÆFLORUM CARNEUM, flesh-colour, tinted with rose.

,, RAJAH, bright fawn-yellow, tinted with rose towards the margin.

,, ROSEUM, rose-pink, suffused with light orange.

OLDER SPECIES FOR TRAINING.

EDGWORTHI, Sikkim, flowers large, white, tinged with blush or pale yellow, fragrant.

FORMOSUM (syn. R. Gibsoni), Eastern Himalaya, flowers white, tinged with purple and yellow.

NUTTALI, Bhotan, flowers white, tinted with rose, large fragrant.

VEITCHIANUM, Moulmein, flowers pure white, large, species half-hardy.

RHOPALA, or **ROUPALA**.—A few species belonging to this genus are cultivated more for the beauty of their bold leaves than for any attraction the flowers possess. A warm greenhouse or conservatory is the proper place for them, allowing each plant ample room, and keeping them scrupulously clean. The species principally grown are R. corcovadensis (synonym Pohli), from Brazil, height 6 feet to 20 feet; R. elegans, Brazil; and R. Vervaeneana. They are propagated in the summer by inserting cuttings of firm shoots, in well-drained pots, filled with pure sand, under bell glasses or in a close frame, in a temperature of 55° to 65°. When rooted the plants are placed singly in small pots, and kept in warm quarters till re-established. Larger sized pots are given as required, using a compost of equal parts of loam, leaf soil, and peat, with a little sand, potting firmly. From April to September well-established plants must have abundance of water, but should not be syringed, as this is liable to disfigure these or any other woolly-leaved plants, nor ought Rhopalas to be topped. Winter them in a temperature of 45° to 50°.

RHYNCOSPERMUM.—A small family of cool greenhouse climbing evergreen shrubs, which ought not to be allowed to go out of cultivation. R. jasminoides (syn. Trachelospermum jasminoides), from Shanghai, yields a profusion of white, sweetly-scented, jasmine-like flowers. A narrow-leaved form, R. angustifolium and R. jasminoides variegatum, with variegated foliage, are the only forms worthy of general culture. Cuttings of firm young shoots, 2 to 3 inches long, inserted in pots of sandy peat, and placed in a close frame kept at a temperature of 65° to 75°, produce roots freely. When the young plants are placed singly in small pots, afford them the benefit of gentle heat and partial shade till re-established. They may eventually be either planted in narrow borders and trained up walls or pillars or flowered in pots. Suitable soil consists in a mixture of equal parts of loam and peat, with silver sand for porosity. Pot firmly. Training the young plants will cause them to branch naturally. Prune lightly after flowering. Give water copiously during the warmer months of the year, and do not let the soil become very dry at any time. Syringe freely before and after the flowering period. A close look out should be kept for solitary mealy bugs; destroying these promptly saves much trouble later on. Nicotine fumes destroy thrips.

RICHARDIA (Arum Lilies).—See COMMERCIAL FLORICULTURE.

ROCHEA.—R. falcata (syn. Crassula falcata) is one of the most showy greenhouse plants of a succulent nature. It produces large heads of bright crimson flowers from June to September, and these are borne on the strong growths formed during the preceding summer. Rocheas may be raised from seed, sowing in March or April, in well-drained pots of sandy soil, only just covering the seed. It will germinate in a temperature of 60° to 70°. The young seedlings, whether pricked out in pans or placed singly in small pots, should be kept close to the glass, a greenhouse shelf answering well, and watered sparingly till growing strongly. Cuttings of shoots 2 to 3 inches long are the best for rooting. These, after being trimmed, ought to be laid on a dry shelf in the full sunshine for two or three days, or till the wounds are dried, prior to inserting them thinly in well-drained pots filled with sandy soil. Place them on a greenhouse shelf, and apply water cautiously till they are rooted; avoid over-potting at all times. Suitable soil is found in a mixture of equal parts of loam and brick rubble, adding good leaf soil and river sand. March is the best time to give the smaller plants a shift, and they must be kept on shelves or other positions near the glass, as only sturdy, well-matured growths will flower. After flowering, the old growths should be freely shortened, and if a shift into larger pots is desirable, give it just when fresh shoots are forming. Winter the plants in the warmest end of a greenhouse, and keep them rather dry at the roots.

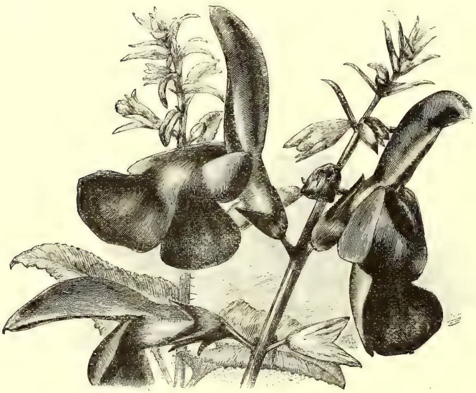

Fig. 106. SALVIA PATENS (RICH BLUE).
(*By favour of Messrs. Sutton & Sons.*)

RUBUS.—Two species belonging to this large genus are recommended for greenhouse and conservatory culture. R. australis, from New Zealand, forms long, strong, branching prickly growths, which produce whitish pink, fragrant flowers early in the summer. R. rosæfolius coronarius, a species from the Himalayas, is moderately vigorous, and gives a profusion of semi-double white flowers later in the summer. Both can be propagated by division in January or February. Cuttings of the roots, 2 inches long, inserted in sandy peat in gentle heat, will develop into neat little plants the same season. They may either be planted in borders against the back walls of conservatories, or afforded adequate root room in pots, using a mixture of equal parts of loam, peat, and leaf soil, with a little sand. Cut down the old growths in January, and re-pot where necessary soon afterwards. Abundance of water and weak liquid manure ought to be applied during the growing season.

SALVIA.

Salvias rank among the most effective and easily grown of warm greenhouse plants.

They are particularly desirable for conservatory decoration, and no plants are more showy in masses. The family is a very large one, but for all ordinary purposes a collection of six to eight species and varieties is ample, growing of each of these in the number of plants desired.

The following are among the best of the salvias: S. coccinea, South America; height 2 feet, flowers scarlet, in twiggy racemes; July. S. fulgens, Mexican Mountains, height 2 to 3 feet, flowers scarlet, large, and borne on long racemes; July. S. involucrata Bethelli: this seedling form of S. involucrata is a very desirable acquisition to the salvias. The plant is of vigorous habit, and in August, or later, produces large whorled spikes of bright rosy crimson flowers; in the bud each whorl is surrounded by large coloured bracts. S. Pitcheri (syn. azurea grandiflora), North America; flowers deep blue on long spikes, very beautiful; August. S. patens, Mexico; flowers large and of a lustrous blue colour; summer. S. rutilans, origin uncertain; height 2 to 3 feet, flowers bright scarlet, in spike-like racemes; summer. S. splendens, Brazil, flowers scarlet, in long whorls; autumn. S. splendens Bruanti, differs slightly, if at all, from S. splendens grandiflora; it is dwarfer, more branching, and produces finer whorls of flowers than the original species, and is the most effective of all the autumn-flowering salvias. S. gesneræflora, a stately plant, producing large, rich scarlet flowers in February and March, is excellent for spring decoration.

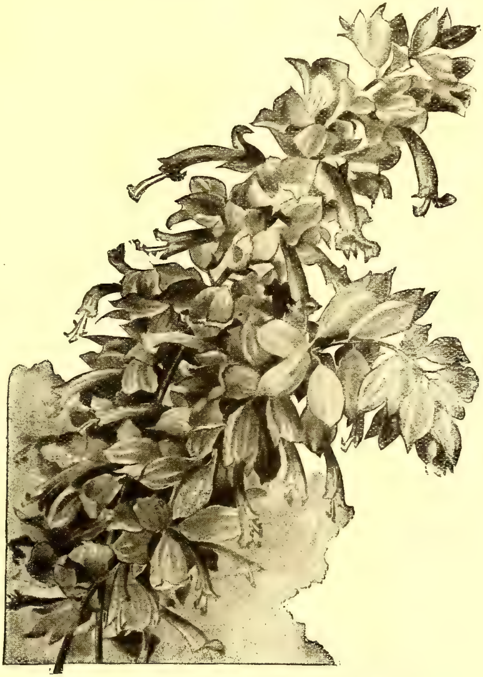

Fig. 107. Salvia splendens grandiflora (rich scarlet).
(*By favour of Messrs. J. Veitch & Sons.*)

CULTIVATION.—Propagation is effected by cuttings of young shoots, taking these as early as possible in the spring, inserting them in sandy soil, in a temperature of 65° to 70°. They are not slow in rooting, and should be topped early, placing them singly in 2½-inch pots directly fresh growths are showing. Keep them growing healthfully in gentle heat, and top repeatedly to make the plants bushy. There must be no undue delay in transferring to larger pots, as the wood of root-bound salvias hardens prematurely, and fails to branch freely afterwards. For the later shifts use a rather rich compost; a mixture of two parts loam to one each of leaf soil, and fine decayed manure with a little sand, answering well.

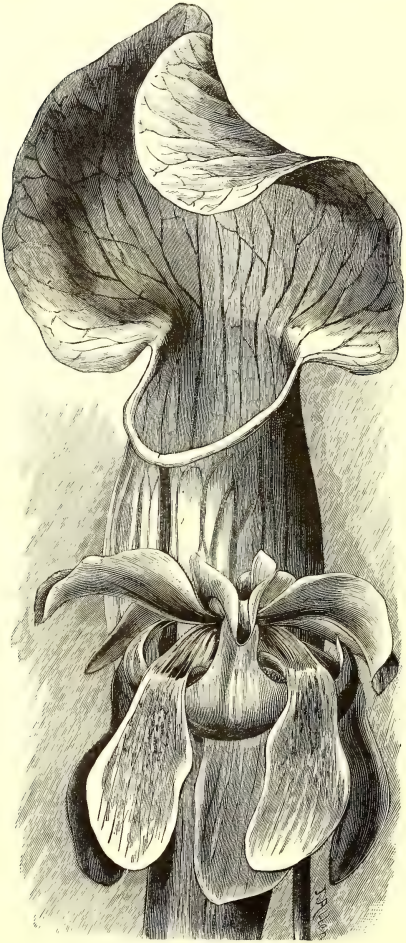
Fig. 108. SARRACENIA STEVENSI.

The stronger-growing species may eventually be shifted into 9-inch or 10-inch pots, but 8-inch pots are usually large enough for S. Pitcheri. Cease topping after the foundation of a good head has been laid, and during the summer arrange the plants either thinly in frames or pits, where they receive abundance of light and air, or dispose them on beds of ashes in a sunny position in the open air. They must be kept well supplied with water, and have liquid manure frequently after the pots are filled with roots.

Some of the herbaceous species, notably S. involucrata Bethelli, and S. gesneræflora, are not unfrequently planted out in good, but not over-rich, ground during the summer, and fine plants are thereby obtained. These must be carefully lifted and placed in pots of a suitable size for holding the roots, doing this not later than the first week in September. Place them in a vinery or other structure where they can be kept syringed and shaded till they have partially recovered from the check of removal. Those kept in large pots should also be housed early, or before frosts have a chance to injure them. A warm, light, and airy position suits salvias best during their flowering season. Old plants may be reduced in size after flowering, rested during the winter where frost and drip cannot injure them, and be further pruned in February prior to starting them into active growth. When this commences, reduce the old soil and roots freely, so that the plants can be placed in smaller pots. Give one liberal shift directly they require it, and subsequently treat similarly to the young stock. The best results usually attend the practice of raising fresh plants every season.

SARRACENIA.

These North American Pitcher Plants scarcely receive the attention they merit at the hands of amateur and professional gardeners. Both their long, erect pitcher-shaped leaves and their quaint flowers are objects of interest to lovers of nature in its many and curious forms, while their cultural requirements are of the simplest description. Propagation is effected by division of the old crowns in March or April. All the species and hybrids should be potted in equal parts of fibrous peat and chopped sphagnum moss, doing this in March. The pots ought to be two-thirds filled with crocks, and the plants, unless previously well-established, lightly supported by stakes. Place the pots containing the plants in other pots two sizes larger, and pack sphagnum moss in the spaces between, and keep this moist. The plants must never be allowed to become dry at the roots, and never be exposed to either hot or cold drying winds. The best position for them is a cool, moist corner of a greenhouse, or a cool frame. They require abundance of water from April to October inclusive, but not much during the winter. On clear summer days shade from bright sunshine, and also syringe the leaves gently. The essentials to success are, thus, a compost that will not readily become sour from frequent heavy administrations of water, a moist close atmosphere in a cool house, and shade from bright sun.

SARRACENIA SPECIES.

S. DRUMMONDI.—Flowers purple, 3 inches long on scapes longer than the leaves. April. Leaves 2 feet long, erect trumpet-shaped narrow-winged; lamina erect, white, reticulated with purple veins. This species has the peculiarity of producing a second crop of pitchers late in the season, which continue fresh on the plant during the winter. S. D. alba has leaves beautifully shaded and reticulated with transparent white at the apex and lamina, while in S. D. rubra the markings are red.

FLAVA.—Trumpet Leaf. Flowers yellow, 4 to 5 inches across, scapes the same length as the leaves. April and May. Leaves erect, 2 feet high, yellowish, trumpet-shaped lip, reddish at the base, or reticulated with purple veins. Atrosanguinea, Catesbæi, limbata, maxima, ornata, and picta, are all forms of S. flava.

PSITTACINA. — Parrot-beaked Sarracenia. Flowers purple on scapes 1 foot high. April and May. Leaves 2 to 4 inches long, slender, tube marked with white spots and lamina inflated, incurved-beaked, almost closing the orifice of the tube.

PURPUREA. — Huntsman's Cap. Flowers purple, scapes 1 foot high. April and May. Leaves 4 to 6 inches long, spreading, tube inflated, contracted at the throat; lamina reniform, erect, hairy within and often purple veined.

RUBRA.—Flowers reddish purple. May. Leaves 10 to 18 inches high, erect, slender, reticulated with purple veins; lamina ovate, beak-pointed, tomentose within. S. r. acuminata is a desirable, taper-leaved form of S. rubra.

VARIOLARIS.—Flowers yellow, 2 inches wide. May. Leaves erect, 6 to 12 inches high, spotted with white near the yellowish trumpet; lamina hairy and reticulated with purple veins within.

HYBRID SARRACENIAS.

Many beautiful hybrids have been raised since the foregoing species were introduced, the result of cross fertilization. The first was obtained by the late Dr. Moore of Glasnevin, and is mentioned below. S. Stevensi (Fig. 108) was raised by the late Mr. Stevens at Trentham, and S. Willisi (Fig. 109) is one of many raised by Messrs. Veitch & Sons. A few of the more noteworthy varieties are:—

ATKINSONIANA. — A distinct form raised between *S. flava maxima* and *S. purpurea*.

CHELSONI.—A beautiful hybrid between *S. rubra* and *S. purpurea*.

COURTI.—Parents *S. purpurea* and *S. psittacina*.

CRISPATA.—Supposed hybrid between *S. flava* and *S. rubra*.

FORMOSA.—A hybrid between *S. psittacina* and *S. variolaris*, and rightly named "beautiful."

MADDISONIANA.—A dwarf form obtained by crossing *S. variolaris* and *S. psittacina*.

MELANORHODA.—A cross between *S. Stevensi*, another hybrid, and *S. purpurea*.

MOOREI.—Parents *S. flava* and *S. Drummondi*.

STEVENSI.—Stately and handsome. Parents *S. flava* and *S. Drummondi*.

TOLLIANA.—Parents *S. Drummondi* and *S. flava*.

WILLIAMSI.—A distinct and striking hybrid between *S. purpurea* and *S. flava*.

WILLISI.—Dwarf, attractive, bright. Parents *S. Melandreda* and *S. Courti*.

SOLANUM JASMINOIDES.—See CONSERVATORY CLIMBERS.

SOLANUM CAPICASTRUM and other berried solanums, see COMMERCIAL FLORICULTURE.

SOLLYA.—There are two species of this small genus of Australian evergreen twiners which are worthy of inclusion among extensive collections of greenhouse plants. These are S. heterophylla, "Australian Blue-bell Creeper," producing its terminal cymes of blue-bell-like flowers freely in the summer, height 6 feet; and S. parviflora, with smaller flowers. They are propagated in the spring or summer by cuttings of half-ripened shoots, inserted in sand, under a bell glass or handlight, in a temperature of 65° to 70°. From small pots the plants are gradually shifted into larger, using a compost

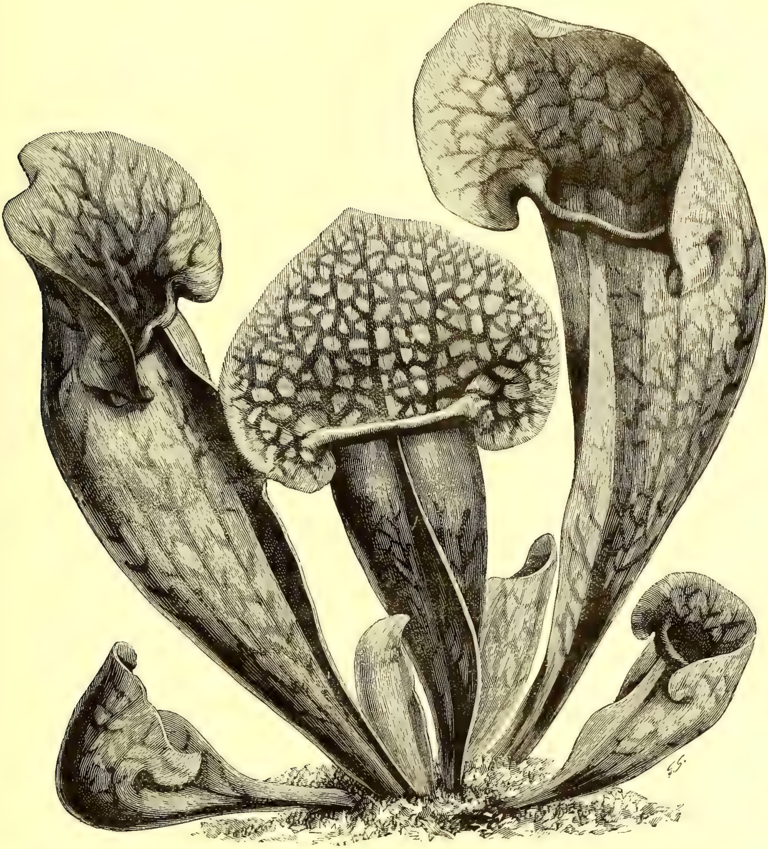

Fig. 109. Sarracenia Willisi.

of two parts peat to one of fibrous loam, with silver sand added, potting firmly. A sunny position is best for the plants, and they may be trained up pillars and rafters. Well-established plants require free supplies of water, and syringing them daily is beneficial during the summer. An ordinary greenhouse temperature is suitable for Sollyas.

SPARMANNIA.—It is doubtful if the value of S. africana is fully realised by the majority of amateur and professional gardeners, though it was introduced from South Africa upwards of a century ago. Properly treated this sparmannia can be grown into large bushes which produce heads of quaint white flowers, with showy yellow filaments, throughout the late autumn and winter months, in either a greenhouse or conservatory. There is a double variety, S. a. flore-pleno, which some persons consider more desirable than the species. Cuttings of firm young shoots, or short lengths of the same, inserted in small pots of sandy soil, under glass in a temperature of 55° to 65°, produce roots freely in the spring. Top the young plants, and a week later shift them into 6-inch pots. Place them near the glass in a frame or pit till growing strongly. They may be arranged in a sunny position in the open air in summer for the shoots to solidify. The topping results in the formation of plants with three or four growths capable of flowering continuously during the following winter. After flowering, both small plants and large bushes should have rather less water than heretofore, and soon afterwards severe pruning ought to take place, all the growths being shortened to within a few inches of the main branches. After receiving more water at the roots, and a few syringings, the plants will re-commence active growth; they ought then to be turned out of their pots and have a considerable portion of the old soil removed from the roots, shortening some of these, and returning to pots the same size as they were in before. A mixture of two parts loam to one of peat or leaf soil, with a little well-decayed manure and sand, forms a suitable compost. Pot firmly, and arrange the plants in a light position in a greenhouse, giving water somewhat sparingly till the roots have taken possession of the new soil, but afterwards they must have abundance of water, with liquid manure occasionally. Any plants that may be wanted to grow to a larger size may have a liberal shift given them before they become root-bound, tubs answering best for the largest specimens. During the summer arrange the plants in the full sunshine as before, and if the growths, where crowded, are thinned out, those reserved will be further strengthened for flowering. House the plants before autumn frost injures them, and arrange them thinly in a light position. The winter temperature may range from 40° to 50°.

STAPHYLEA COLCHICA.—See **FORCED SHRUBS FOR CONSERVATORIES.**

STATICE.—The species adapted to greenhouse culture are remarkable for their freedom in flowering and the durability of their flowers. Statices are sometimes effectively displayed at exhibitions. S. Halfordi, a garden hybrid from S. imbricata—a species from Teneriffe—is of strong growth and produces large branching heads of blue flowers in the summer. The more popular S. profusa is a hybrid between S. puberula and S. Halfordi, than which it is of a more branching and shrubby habit of growth, and also much more floriferous. S. p. intermedia and S. p. Gilberti have larger flowers than the type, and for exhibition purposes must be regarded as distinct advances. S. Halfordi is often raised from seed. Fine bold plants can be grown in one season, for flowering strongly the following summer. In February or March sow the seeds in well-drained pots or pans, filled with sandy soil, cover with glass and shade heavily; with uniform moisture, germination is free in a temperature of 55° to 65°.

When large enough, insert the seedlings an inch or two apart in pans filled with a mixture of fine loam, peat, and sand, and place them in gentle heat not far from the glass till they are well established, when they ought to be moved singly into 2½-inch pots. They must be assigned a very light position and kept growing in a temperature of 55° to 65°, gradually shifting them into larger pots till the 9-inch size is reached. These and the other kinds succeed well in a mixture of three parts fibrous loam to one part each of peat and good, natural leaf soil, with sharp sand and nodules of charcoal freely added. Pot firmly. The more shrubby kinds are principally increased by cuttings. These should be inserted singly in small pots during February or March, covered with a bell glass or handlight, and kept in a temperature of 55° to 65° till rooted. Subsequent treatment is the same as recommended for seedlings, only the plants from cuttings will not grow so rapidly, nor, consequently, require such large pots the first season. Any flower heads that show ought to be pinched out at once when the plants are young, this invigorating them and causing them to branch strongly.

During the summer a cold pit or frame is the best position for young statices, taking care to keep them well supplied with water, and worms out of the pots. Winter the plants on a light, airy stage in a cool greenhouse. Older plants requiring more pot room should have a small shift in March or April; others with their pots well filled with roots, but not standing in need of a shift, ought to have weak liquid manure occasionally. The flower heads will develop to their full extent in an airy greenhouse, and may be regulated or trained to a globular form.

STREPTOCARPUS.—See FLORISTS' FLOWERS, page 111.

STREPTOSOLEN.—There is only a single species belonging to this genus—S. Jamesoni

—which is also known as Browallia Jamesoni. It is a native of Columbia, and may be briefly described as a warm greenhouse evergreen flowering shrub, which may be had in flower from May to August. The flowers are of a bright orange colour, and under good culture the plants are highly attractive. The cultural requirements of Streptosolen are of the simplest description, and, with so many good qualities to commend it, the wonder is that so few plants are grown by amateurs. It is propagated in the spring by cuttings of young wood, inserted in pots of sandy soil, placed in a close frame with a temperature of 55° to 65°. The newly-rooted cuttings, after having been slightly hardened, are topped, and, when fresh shoots form, placed singly in 2½-inch pots. They are started in gentle heat, and afterwards grown on a greenhouse shelf. Topping is repeated as required to form a bushy habit. Before the plants become root-bound they are placed in 5-inch or 6-inch pots, in which sizes they may be flowered — unless larger specimens are desired, in which case another shift is desirable. They are not fastidious as to soil, but thrive satisfactorily in a mixture of two parts loam to one part of leaf soil, with a sprinkling of sand. A light position in greenhouse or conservatory, shading from strong sunshine only, is suitable for them when in flower. The plants ought never to become very dry at the roots, and they are benefited by occasional supplies of liquid manure. They may be supported with light hazel stakes, and wintered at the warmest

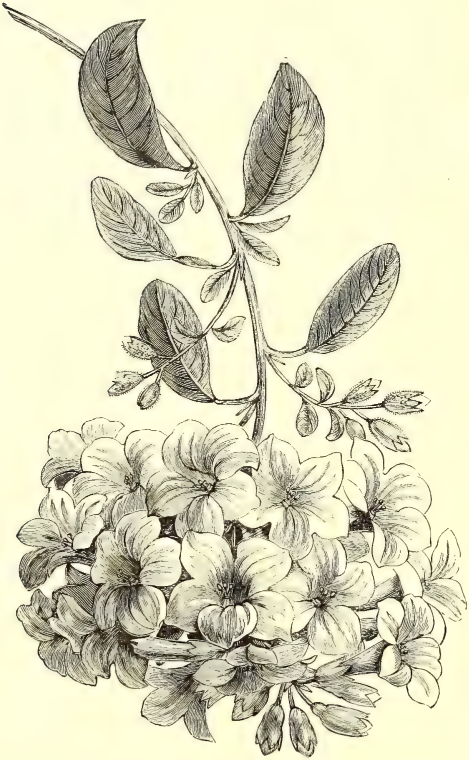

Fig. 110. Streptosolen (Browallia) Jamesoni. (Deep orange.)

end of the greenhouse. Early in February they are freely pruned, and a fortnight afterwards have the old soil and roots reduced and re-potted, these old plants, in addition to giving abundance of good cuttings, flowering freely in early summer.

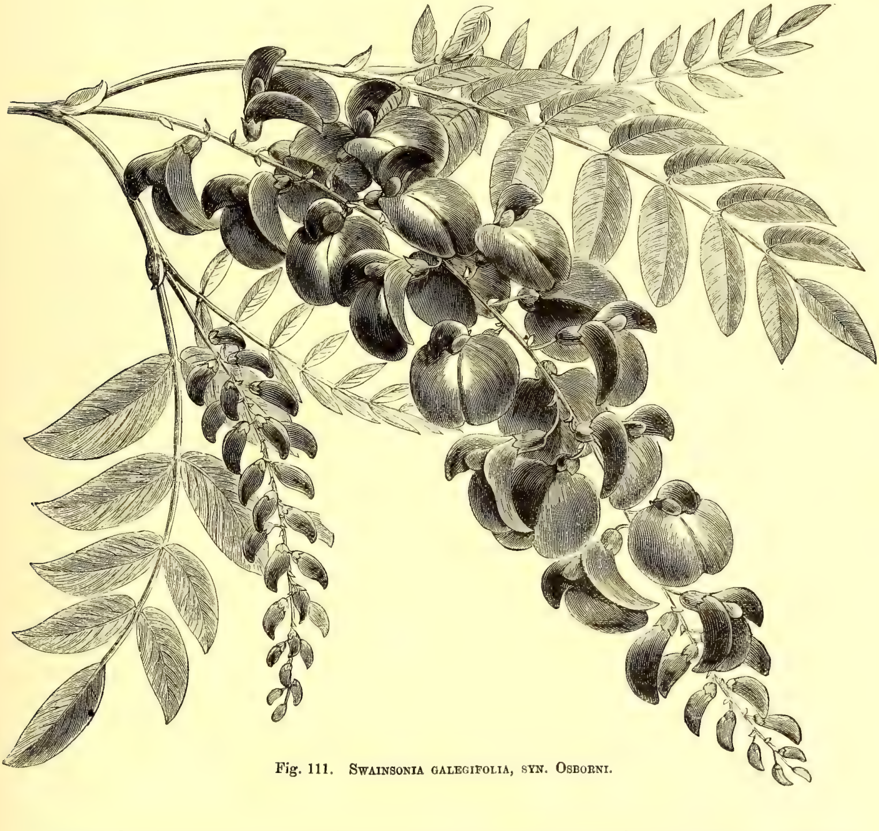

Fig. 111. Swainsonia galegifolia, syn. Osborni.

Streptosolen Jamesoni (Fig. 110) is a beautiful greenhouse plant worthy of general cultivation.

SWAINSONIA.—We are indebted to Australia for this handsome family of greenhouse evergreen flowering shrubs. They are of a somewhat rambling habit of growth, and better adapted for growing against pillars and walls than for the open stages of greenhouses and conservatories. S. galegifolia, syn. S. Osborni (Fig. 111), attains a height of 6 feet, branches freely, and produces drooping racemes of pea-shaped flowers, deep red in colour, from May to September. The white form of this S. g. albiflora is the most popular, and is a chastely beautiful flower. S. coronillæfolia has light purplish pink flowers, while S. Greyana, pink, is a favourite with some cultivators. All are propagated by seeds or cuttings. Prior to sowing in March, soak the seeds in warm water till they have softened somewhat; germination will take place in a moist heat of 60° to 65°. The seedlings should be placed singly in small pots and peaty soil, a gentle heat giving them a good start. Top to cause them to branch, and, seeing that swainsonias root strongly, there ought to be no undue delay in shifting them into larger pots. A compost of three parts loam to one part each of peat and leaf soil with sand, suits the plants. Cuttings of healthy young shoots, about 3 inches long, may be inserted in pots of sandy peat soil, and rooted under a bell glass or hand-light in a cool shady part of a greenhouse during the summer. Treat the rooted cuttings similarly to seedlings, arranging all where they can be freely syringed daily in hot weather, this keeping red spider in check. Winter the plants in a temperature of 40° to 45°. Old plants may be lightly pruned early in the spring, and soon afterwards repotted. During the following summer, in addition to receiving abundance of water at the roots, and frequent syringings, weak liquid manure may be applied with advantage. For covering walls or pillars plant in borders.

TACSONIA.—See CONSERVATORY CLIMBERS.

TECOMA.—See CONSERVATORY CLIMBERS.

THEA.—Tea Plant. This small genus of greenhouse evergreen shrubs is more interesting than handsome. At one time it was thought the Assam, Bohea and Chinese (T. viridis) were all distinct species, but they are now considered identical, varying under different treatment. The type grows from 2 feet to 6 feet in height, has dark green leaves, and produces white flowers throughout the cooler part of the year. S. viridis variegata is a prettily variegated form. Propagation is effected in various ways. Seed sown in sandy peat in March, and placed in a moist heat of 70° to 80°, germinates readily. Cuttings of firm young shoots, inserted in well-drained pots of sandy peat, in a cool greenhouse during August, emit roots slowly but surely. If covered with glass, this must be dried every morning, or damping may take place. Layering the shoots may be done in September, and grafts will unite with young seedling stocks of camellias; the plants grow well in a mixture of equal parts of sandy peat and brown fibrous loam. They may also be planted in conservatories in common with camellias. Plants in pots can be arranged in the open air on ashes, boards, or tiles, affording them shade from strong sunshine. They may be wintered in a temperature of 40° to 50°. Regulate the growth by lightly pruning early in the spring, and repot, if necessary, soon afterwards. That is also the best time to plant them in conservatory borders.

TROPÆOLUM.

For greenhouse culture tropæolums may be roughly divided into two sections—the climbing evergreen perennials, of which T. Lobbianum is a good type, and the tuberous-rooted group, of which probably the best known is T. Jarratti. Varieties of the first-mentioned are particularly recommended for flowering in greenhouses and light conservatories during the dull months of the year. Thinly trained up pillars and rafters they flower grandly, their bright colours contrasting admirably with the clean, neat foliage of the different varieties. Ball of Fire, scarlet, is one of the most effective. Clibran's Gem is a good companion. Clapham Park has clear orange-scarlet flowers and fine bold foliage, while Peter Rozenkranzer has dark foliage and brilliant scarlet flowers. Both the Double Yellow and Hermine Grasshoff, double orange-scarlet, are also good for winter flowering, but they are not so vigorous as the single varieties, and should be trained round stakes.

The single flowering varieties are easily raised from seed, sowing this in gentle heat in the spring, but are more frequently propagated by cuttings, with the double varieties; they produce roots freely in a temperature of 60° to 65°, not covering too closely with glass, or damping occurs. First establish the young plants in 3-inch pots, and then transfer direct to 8-inch or 9-inch sizes, in which they are desired to flower; or plant in greenhouse boxes or narrow conservatory borders. They should have a moderately rich firm compost, and when well established in their flowering quarters need copious supplies of water and weak liquid manure occasionally. If the flowers are kept closely pinched off during the summer and early autumn months, the plants make better progress at the time and flower more abundantly later on. A winter temperature of 45° to 55° is not too high. Young plants are preferable to old ones and a fresh stock should be raised every spring.

The tuberous-rooted section are of a neat twining habit of growth, and most effective when thinly trained over sprays of birch, or a light balloon-shaped trellis formed with green hazel stakes, and either fine string or matting. Wire trellises are too heavy for the purpose. The species principally grown are T. azureum grandiflorum (Chili), flowers azure blue; June. T. Jarratti (Santiago), flowers bright orange-scarlet, spotted with yellow at the base of the calyx, petals bright yellow; June. T. pentaphyllum (Buenos Ayres), flowers purple and vermilion; and T. tricolorum (Chili), flowers scarlet, black, and orange; June to October.

These tuberous-rooted species may be raised by sowing seeds in the spring, in light sandy soil and a temperature of 55° to 65°. Cuttings of the slender, wiry shoots, inserted in sandy soil in a temperature of 55° to 56°, callus and form small tubers the same season, as do also the seedlings. When the foliage of either large or small plants turns yellow late in the summer, water must be withheld and the pots stored away for a few weeks.

Directly the tubers push their wiry shoots in the spring all ought to be carefully turned out of the soil, keeping a close look out for any small ones, and at once be placed direct in their flowering pots. These must be well-drained. Three large tubers are enough for a 9-inch pot, and a single large tuber for a 6-inch size. The soil suitable is a mixture of equal parts of fibrous loam, leaf soil and peat, with silver sand added. Bury the large tubers not less than 2 inches deep in the soil. We have seen some placed 6 inches deep with advantage, as roots issue from the underground stems. Arrange the pots in a sunny position in the greenhouse, and for the first few weeks give water very sparingly, as too wet and sour soil is injurious to the young roots. When growing strongly apply water freely, and weak liquid manure is beneficial to the plants when in flower. Train the young shoots frequently, as they have a tendency to coil round each other, thus spoiling the plants.

URCEOLINA.—Species of this small genus of bulbous-rooted South American plants are frequently found growing in hot-houses or plant stoves, whereas they succeed equally well in a warm greenhouse, where they would be more appreciated. U. latifolia produces umbels of yellowish red flowers in September; U. miniata flowers in August and September, colour cinnabar-red or scarlet; while the best-known species, U. pendula (Fig. 112), produces umbels of drooping yellow and green flowers in June. The treatment necessary corresponds in all particulars with what has been recommended for Amaryllis, see page 289, Vol. I.

VALLOTA.

The popular "Scarborough Lily," V. purpurea, is to be met with in nearly every garden where greenhouse plants are grown, but, unfortunately, not always in the best condition. Failures have been attributed to the attack of mites which feed on the roots and paralyse their action, but if the plants had not previously been enfeebled by faulty treatment, much less mischief would have been done.

Vallotas must not be dried off like amaryllises; they are evergreen, and do not of necessity require to be repotted every year; on the contrary, once in three or four years is often enough if the plants are in good health. Vallotas can be rapidly increased by offsets which form round the older bulbs. These should be detached with roots in June, which is a suitable time for repotting. Dry bulbs may be potted in the autumn. These should be graded. Three or four of the small size may be started in a 3-inch pot, the same number of medium-sized bulbs, or one large one with side bulbs intact, in a 6-inch pot, and three of the largest size suffice for a 7-inch pot. The pots must be clean and well drained. Suitable soil consists of a mixture of equal parts of sound fibrous loam and leaf soil, with a free sprinkling of sand. Dry bulbs should be embedded in sand, and all ought to be buried to their full depth, only the points showing above the soil, instead of being nearly exposed, as frequently happens; and the soil must be made firm about them.

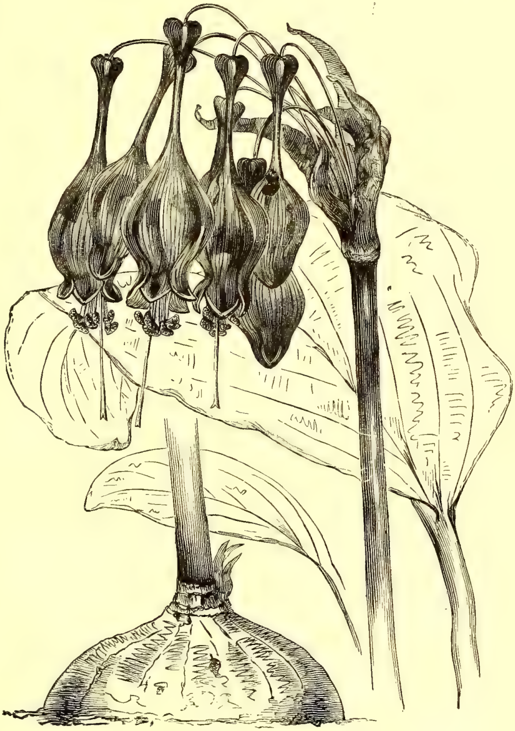

Fig. 112. Urceolina pendula.

The plants may be grown in a greenhouse or frame during the summer. Too much water is often given before the root action is free. As the smaller bulbs increase in size and fill the pots with roots, shift the plants into larger pots, but, as previously indicated, the larger flowering bulbs are better for being in a root-bound state, so long as this does not unduly weaken them. Clear soot water may be given with advantage to well-established plants. The soil should be kept uniformly moist all through the winter, and a temperature of 40° to 50° is ample for the plants. Thus, well treated, there is little likelihood of the mite getting the upper hand.

VARIETIES.

VALLOTA PURPUREA.—The original species (Fig. 113) produces several large red flowers on stout scapes from August to October.

CARNEA.—One of the latest additions to the group, is of a delicate flesh colour, and a welcome addition.

EXIMIA is of the same shade of colour as the type, but has a white throat, feathered with crimson.

MAGNIFICA is said to be a more robust grower than the preceding form, and somewhat richer in colour.

MAJOR (syn. Amaryllis purpurea) is remarkable for the great size of its flowers, colour reddish scarlet.

MINOR is the smallest form of all; cherry red in colour.

VERONICA.—Only a limited number of veronicas are cultivated in greenhouses. The best for the purpose are Andersoni, a garden hybrid, Andersoni variegata, Andersoni Madame Louise Giron, and Purple Queen. The dwarf variety, Blue Gem, is extensively grown for sale in the flower markets. Shrubby species may be propagated in the spring by cuttings of firm young shoots in sandy soil under a bell glass, but can be depended upon to root more freely under handlights or in a cool frame in the summer. Top the young plants to make them bushy, and from small pots shift into 5-inch or 6-inch sizes the first season, and they may produce a few flowers in the autumn. The plants should be wintered in a cool greenhouse. Prune in March, and, when fresh shoots are visible, reduce the soil and roots and repot, using a mixture of two parts loam to one of either peat or leaf soil, with some sand. During the early part of summer transfer to larger pots, and arrange the plants on ashes in the open air. Veronicas need much water when the pots are crowded with roots, and succeed well if planted in good ground in the open, lifting and repotting in September. It is in this way that the dwarf variety above mentioned is grown. All should be housed early in September, as they ought then to be gay with flowers.

WITSENIA CORYMBOSA.—This is another of the old-fashioned greenhouse plants fast going out of cultivation, because it is of slow growth. It is of an erect compact habit, each shoot being furnished with a dense cluster of short iris-like leaves; flowers blue;

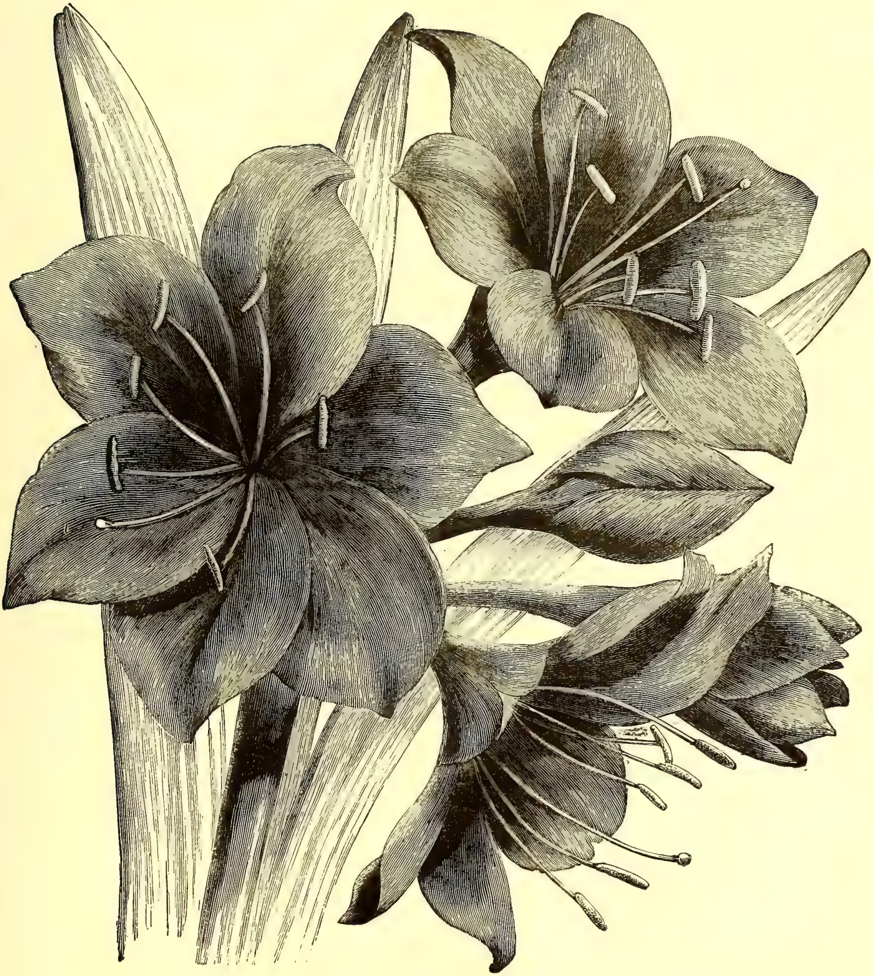

Fig. 113. Vallota purpurea. (Natural size.)

June. Plants may be raised from seeds sown in gentle heat in March or April, but are more often obtained by offsets from the old plants. Firm potting is requisite, in a mixture of two parts sandy peat to one of loam, and not much root-room is required. A light position in a freely ventilated greenhouse is the best position for this plant, and care must be taken not to sour the soil by over-watering.

YUCCA.—Of this large genus a limited number of species and varieties are recommended for pot culture in greenhouses or conservatories, and these for the beauty of their leaves. Y. aloifolia, a species with broad glaucous leaves, and its varieties, quadricolor leaves reddish; lineata lutea, leaves white and yellow; variegata, leaves with whitish stripes, are, with Y. filamentosa variegata, leaves having pale yellow markings and thread-like filaments, sufficient for most establishments. They are propagated by division or offsets in the spring, and by pieces of thick, fleshy roots, cut into short lengths, and inserted in sandy soil in a temperature of 50° to 55°. Any plants which are very much root-bound should have larger pots in March, employing a mixture of two parts sandy loam to one of leaf soil, with sand added. During the summer these yuccas may be used for the decoration of the flower garden, plunging them in pots—not planting out; or they may be grown constantly in light greenhouses and conservatories. They should be kept in a cool greenhouse during the winter, and will not require much water. It may be observed that when Y. filamentosa variegata is grown in peat in a stove temperature, the variegation is white, and the plant very beautiful. It is noteworthy that many plants of it in the grounds of Messrs. Pearson & Sons, of Chilwell, Notts, have passed without injury through a long series of winters.

Many other plants than those described in these pages are mentioned in trade catalogues, but only cultivated by a few connoisseurs.

THE PLANT STOVE.

NO garden with any approach to being regarded as of high-class character may be said to be complete without a house or houses for the cultivation of tropical or heat-loving plants. These structures are termed hot-houses, or, more commonly, stoves. With their aid many of the most beautiful flowering and fine-foliaged plants in the world can be admirably cultivated. Much can be done with a single house, but the culture of tropical plants is greatly simplified when it is possible to group those requiring the most heat in a house or compartment by themselves, or apart from others not needing equally high temperatures—a fact that ought not to be lost sight of when new stoves are designed and constructed.

FORMS OF STRUCTURES.

No particular form of structure may be considered as being absolutely necessary, any more than in the case of greenhouses. The same class of houses answer for both, but the heating arrangements must be very different. Plant stoves and forcing houses may be either lean-to, three-quarter span, or span-roofed, according to circumstances. When they form part of a long range against a wall, they are either lean-to or three-quarter spans.

The span-roof is the best form of structure that can be chosen. In order to bring out the true character of stove-plants, whether they be grown for the beauty of their foliage or flowers, or the two combined, abundance of light as well as heat and moisture must reach them. When span-roofed houses run, as they ought, from the north to the south, the occupants derive full benefit from the light, without actually suffering from an extreme of sun heat at any particular time of the year. The interior arrangements of span-roofed houses can be made to lend themselves to the effective arrangement of the various plants grown in them, while at the same time the great majority may be easily reached, and attended to by persons in charge—an advantage which only those who have been responsible for the health of plants arranged on wide beds or inconvenient stagings can fully appreciate.

A width of 18 feet is suitable for a span-roofed house. If much wider, considerably higher roofs are necessary, and this means a greater expense in the heating arrangements as well as in fuel, while many of the plants would have to be grown farther away from the glass than is good for them. There need be no limit to the length, but a span-roofed house 50 feet long would hold a good collection of plants. Avoid flat roofs, as these are not so durable as those with a sharper angle, and there is more drip from the former than is good for most plants on which it falls. If the supporting walls are 30 inches high, and the side-lights resting on them 3 feet high, the central ridge may be 12 feet high, measuring from the door sill.

Much lighter rafters are used than formerly, and in some instances they are dispensed with altogether, central iron standards and moderately stout sash-bars, with two purlins and cross-bars, meeting the case. Fig. 114 is an illustration of a house designed and built by Messrs. Messenger, of Loughborough, somewhat on the lines just indicated. It is essentially useful, and of a neat, pleasing appearance. External ornamentation can be indulged in to any desired extent, but it should never be at the sacrifice of internal utility. In construction the best red deal should always be used, and no flat surfaces on which water can lodge permitted. For the ends and sides 15-oz. glass may be used, but 21-oz. glass is needed for the roofs. Glaze without top putty, and otherwise treat as advised in the hints upon the construction of greenhouses (page 132).

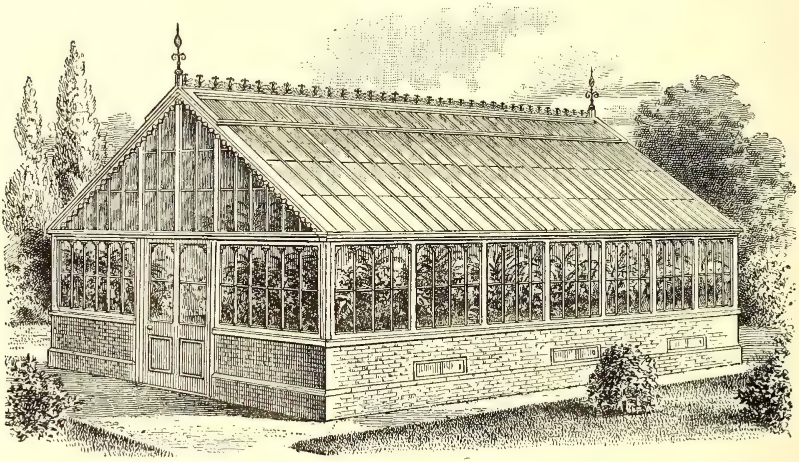

Fig. 114. SPAN-ROOFED PLANT STOVE.

A material difference, however, should be made in providing means for ventilation. The contents of stoves are injured rather than benefited by the admittance of much air, especially at the ends or sides. Movable side-lights, if provided, are rarely opened by successful growers of stove plants, and are not really necessary. A few "hit and miss" slides may be let into the walls at intervals of 3 feet or so apart, and when these are opened a moderate amount of cold air passing over the hot-water pipes before it comes into contact with the plants does not injure them. It is at the top, or ridge, where ample provision for ventilation should be made. Ordinary lap ventilators in the front of lean-to, and on both sides of span-roofed houses, are the best. These may be either continuous or as far apart as they are wide, and all ought to be opened and closed with an easily constructed crank and lever apparatus. All the hinges used should be either of brass, or revolve on brass pins, the first from choice as being the least likely to rust.

INTERIOR ARRANGEMENTS.

In the case of span-roofed houses provision can be made for the growth of tall plants on central beds, or staging 5 to 6 feet wide, and side stages 2 to 3 feet wide, fixed on a level with the wall plate, for the smaller plants, this leaving ample room for pathways. The figures for a house 18 feet wide would be central bed 6 feet wide, side stages 2½ feet, and walks 3½ feet wide. A three-quarter span-roofed house might have a front side-stage or bed stand, also a flat stage, as shown in Fig. 115, between the back wall and pathway. This represents an extremely useful structure, without front sashes, for preparing plants for larger houses or room decoration. Ventilators are fixed in the front wall, next the hot-water pipes. Lean-to houses are also arranged with a front stage, and a pit or stepped staging connected with the back wall.

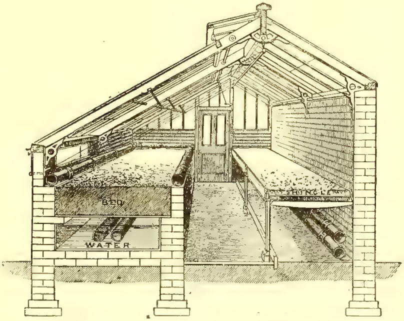

Fig. 115. PLANT STOVE, THREE-QUARTER SPAN.

Constant exposure of wood to heat and moisture leads to its early decay. Hence the necessity for employing as little of it as possible for supports and fittings in plant stoves. Iron standards and framework, supporting slabs of slate, are the best for the side stages, but corrugated iron covered with spar is cheaper, also neat and suitable. The central stage may be similarly constructed, or a pit formed with brick or stone walls. If bottom-heat pipes are provided, they may be enclosed by iron gratings, the space above them filled with tanners' bark, leaves, or other sweet fermenting material, or a chamber may be formed over the pipes, with either iron or oak quartering, as bearings for supporting slates.

HEATING.

An insufficiency of hot-water pipes, and boilers which are too small for their work, are common errors that ought to be avoided when making arrangements for heating stoves. Having to make the water in the pipes excessively hot in order to maintain the required temperature in a house, involves a great consumption of fuel, while highly heated surfaces are injurious to the occupants of a house. In many cases fuel might be saved, and the health of plants improved, by the addition of an extra flow and return pipe to those originally fixed. Tables of figures showing at a glance the amount of 4-inch piping needed when fully heated, to insure the necessary temperature in a house in severe weather, are frequently included in works treating upon the subject of heating, but are apt to mislead.

For a stove, 60 feet of 4-inch piping is sufficient for every 1,000 cubic feet of space to be heated. In order to arrive at the exact amount required, multiply the length by the breadth in feet, and the total by the average height in feet. Thus supposing a house measured 40 feet long × 18 feet wide × 12 feet high at the ridge, and the sides 5 feet high, the average height would be 5 feet + $3\frac{1}{2}$ feet = $8\frac{1}{2}$ feet, and 40 × 18 × $8\frac{1}{2}$ feet would total 6,120 cubic feet consequently 360 to 370 feet of 4-inch piping would be sufficient, or about two-thirds of the amount some tables give us as the correct figures. The equivalent of 50 feet of 4-inch piping is $66\frac{2}{3}$ of 3-inch, or 100 feet of 2-inch, but the larger size should always be employed where possible.

Roughly speaking, it will be found that four rows of 4-inch pipes, two flows and two returns, taken round an ordinary span-roofed house, page 248, are sufficient, while for lean-to and three-quarter span-roofed houses two flows and two returns may be taken along the ends and fronts, under the staging, with perhaps a flow and return in a grating-covered chamber, under the back pathway of the wider structures; or the pipes may be arranged as shown in page 249. Four pipes for affording bottom heat are needed in the central pit of a large span roof, or two under a narrow bed. Every second full-length flow pipe round the fronts and sides of the house ought to have a trough for water, these evaporating troughs, if kept filled as required, proving of considerable assistance in maintaining a moist atmosphere.

Boilers.

Of whatever form these may be they ought to be large enough for heating the amount of piping attached to them without the necessity for hard firing, as this is wasteful of fuel; and yet they must not be too large or powerful, as this extreme is the reverse of economical. Small boilers may be of cast iron, but for hard work those formed of wrought iron are preferred as being the more reliable. Boilers of the saddle type are, as a rule, the more favoured, as they do not require deep stokeholes with expensive drains to prevent flooding, and since the introduction of saddle boilers with water-way backs, check ends and flues, their heating power is very great. The Chatsworth Boiler, Fig. 116, has fully equalled the expectations formed of its heating capacity. It is made in various sizes to heat from 500 to 2,000 feet of piping. The largest size is not more than 84 inches long by 32 inches high, and this is capable of heating 2,350 feet of 4-inch piping. Boilers of this type require no great amount of skilled attention, and because of the length through which the smoke has to travel before it reaches the chimney, there is very little waste of heat. Much that has been advanced concerning the Chatsworth also applies to the three-flued Express or Gold Medal Boiler, of which many are doing good work in various parts of the country. In this instance moderately tall chimneys are required, or the draught may not be equal to taking the heated gases through the extra length of flues before reaching the chimney. In any case the flues of boilers ought to be well cleaned out once a week.

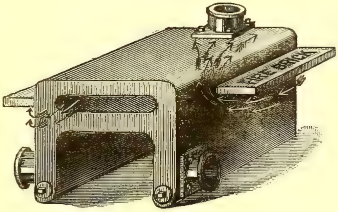

Fig. 116. The Chatsworth Boiler.

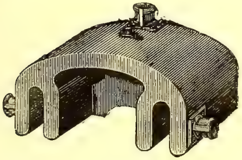

Fig. 117. The Delta Boiler.

The Delta, shown in Fig. 117, is constructed for very shallow stokeholes, or where it is not possible to form a deep drain for keeping them dry. One of these saddle boilers, capable of heating 1,000 feet of 4-inch piping, measures 48 inches long, 42 inches wide, and only 21 inches deep. An illustration of the Cyclops, an upright top-feeding boiler, is given in Fig. 118. This is economical, doing its work quickly and well without the expenditure of a great amount of fuel.

Reference may be made to the Trentham Cornish Boiler, a considerable number of which are in use for heating large areas of glazed buildings. It is questionable, however, if these costly boilers are so effective and economical of fuel as are the different forms of Rochford Horizontal Tubular Boilers, which will be illustrated when Commercial Floriculture is treated upon. Brief allusion ought also to be made to the type of boilers that require little or no setting. For heating from 400 to 700 feet of piping the Southwark (Fig. 119) will meet the case. This boiler requires no setting. In all cases, vendors of boilers supply sizes according to the amount of piping to be attached. The figures they give are calculated on the basis of one superficial foot of direct-heating surface being equal to heating 35 feet of 4-inch hot-water piping.

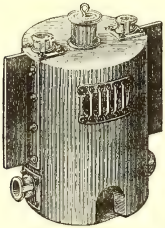

Fig. 118.
The Cyclops Boiler.

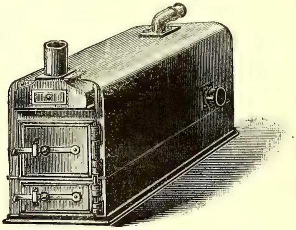

Fig. 119. The Southwark Boiler.

Arranging and Fixing.

Too often the inexperienced individual who may be entrusted with the arrangement of heating appliances proceeds on the assumption that the heated water forces the cold water upwards, and round by way of the return pipes to the bottom of the boiler. In reality the circulation is promoted by the difference in the specific gravity of warm and cold water, the latter being slightly the heavier, driving the heated water out of the top of the boiler and onward, this cooling and returning to the lower part of the boiler. In fixing the pipes the gradients should be made as easy as possible. Particularly ought dips to be avoided, as cold water collects in them, this tending to force the hot water back towards the boiler, and thus checking free circulation.

It is considered that a continuous rise of one inch in seventy-two inches is necessary to secure a good circulation of water in the apparatus. If "dips" cannot be avoided a competent engineer ought to be employed to make the necessary arrangements for obviating the difficulty, as this will be found economical in the end; also avoid employing small pipes to connect the principal pipes in the houses with the boiler, as these check free circulation; and it may be pointed out that pipes exposed in and about the stokehole, or any forming the mains, ought to be well enclosed with felting or asbestos for preventing waste of heat.

Joints.—The joints of pipes near the boiler are usually "made" with rope and either red lead or iron filings, mixed with ammonia to hasten rusting and insure solidity. For other positions expansion joints are now preferred, as these are more easily put together and can be taken apart as often as may be needed. Pipes are specially cast for the purpose, some with and others without socket ends; loose glands or collars, enclosing india-rubber rings and bolted together, form a perfect expansion joint. The fittings are supplied to correspond, and an ordinary workman can put all together.

Supply Cisterns.—These are necessary for keeping the pipes filled with water, and they also answer the purpose of expansion tanks. Wherever located they must be fixed a little above the level of that of the highest pipes they have to supply. In the case of a very small apparatus, the cistern is often fixed at the end farthest from the boiler, but for all large and moderately large apparatus, the cisterns are usually fixed nearly over the boiler, and the feed pipe connected with a return pipe near to where it enters the boiler, the coldest water thus being brought nearest the fire.

Air Pipes.—At the extreme ends of each section of flow pipes, and at the points of their greatest elevation, outlets are needed for the air that has to escape before the pipes can be filled with water. At these and other raised bends the air is apt to collect, and impede the circulation of heated water, and therefore pipes or taps must be provided for the exit of the air. If taps are used they ought to be opened frequently, a very little air effectively stopping the circulation; while if lead pipes are preferred, these must terminate 3 feet higher than the feed cistern, and should be examined at least every autumn to see that the apertures are not stopped up in any way.

Valves.—If only one house is heated by a boiler, valves can be dispensed with, though they are often serviceable; but they are absolutely necessary where several houses or divisions have to be heated from one boiler. By their aid the heat can be regulated as desired, checking the hot water from unduly rushing to certain points, and diverting it to where it is more wanted. For this purpose ordinary throttle valves are suitable, but for entirely shutting off water from the boiler, screw-down valves are the best. As these are, however, somewhat expensive, they are seldom employed other than near boilers.

Coating Pipes.—The pipes generally ought to be coated with a paint made by mixing common vegetable or lamp black with boiled oil, adding a small quantity of painter's driers. This is done to prevent the iron pipes rusting, and it also improves their appearance considerably. Coating them with tar, as is sometimes ignorantly done, is ruinous to plants.

Rain or soft water is much the best for filling boilers and pipes, as hard water is liable to leave a lime deposit, which impedes the working of the apparatus. The incrustation may eventually prevent the water coming into contact with the boiler plates, with the result that these are burnt through in a short time. Especially is soft water desirable in the case of tubular boilers, the tubes most exposed to the heat quickly becoming blocked if hard water be used.

Means ought always to be provided for emptying boilers and pipes as often as may be needed, both in case of repairs and for flushing the tubes and drawing off deposits before they become solidified.

STOVE MANAGEMENT.

Stove plants, or those from tropical regions, require much more heat and moisture in the atmosphere than do greenhouse plants, but with these essentials provided, they are really more easy of culture. What is also greatly in their favour is the fact that the majority of heat-loving plants are of free, and many of rapid growth, in this respect affording a marked contrast to the hard-wooded sections of greenhouse plants. The requirements of the many and various occupants of plant stoves, of necessity, vary considerably, and the particular needs of important kinds will be embodied in cultural details; but first, a few obstacles to success applicable to all may be pointed out—low temperature; dry overheated atmosphere; dryness at the roots of plants, more especially during the growing season; over-watering those newly repotted and others plunged in moisture-holding material; failing to afford shade at one time, and giving too much at another; neglecting to keep the plants free from insect pests—are all frequent causes of failure, therefore each of them must be constantly guarded against.

Much depends upon the position in the houses assigned the different kinds of plants that we hope to see in a flourishing state. Some few, crotons for instance, revel in abundance of sunshine, and ought, therefore, to have as much of it as possible ; still more, or the great majority, thrive best in light positions near the glass, but require to be shaded from strong sunshine ; while eucharises, anthuriums, alocasias, and a limited number of other choice genera, are most at home in positions where neither much heat, direct from the hot-water pipes or sun, nor strong currents of air can reach them. It is only by experience that the right positions for the plants more difficult to grow can be found ; but once they are seen in a perfectly satisfactory condition, avoid shifting them to other parts of the house, or to other structures, unless on a small or tentative scale. Overcrowding the plants is also a great mistake. In a dense mass they may appear, from a casual glance, to be effective, but will not bear critical inspection, and are of little value for either grouping at flower-shows or for house and table decoration. Not unfrequently plants are preserved too long. They become too large for their positions, lose the freshness that is inseparable from beauty, and spoil each other. Young, healthy, free-growing plants are far more attractive, and a supply ought to be annually raised to take the place of the older removed.

The end or back walls of structures, pillars, and, to a certain extent, roof trellising may be turned to account in the growth of trailing and climbing plants, many of which are very beautiful, but these should not be encouraged to the extent of practically spoiling a variety of plants in pots underneath. Very few stove plants are taken to conservatories for any great length of time, for the sufficient reason that they soon sustain injury under the conditions that prevail in those places. This being so, every effort should be made to make plant stoves as attractive as possible, and to keep their occupants in such a clean and well-arranged state that they may be fully enjoyed by those who inspect them.

Temperature.

In many, perhaps the majority of gardens, only one plant stove is to be found, and in this case the only distinction that can be made between plants that come from the higher tropical regions, and those from parts where the heat is less intense and the atmosphere drier, is to arrange those requiring the most heat and moisture in the hottest part of the house and the hardier kinds nearer the doorways.

February is usually a busy month with plant growers, and it is then when the year's work may be said to commence in growing the plants under notice. For what may be termed the hottest plant stove, the temperatures may range from 60° to 65° by night, and from 65° to 70° by day, though the highest figure may be exceeded by 10° with the aid of sun heat. In March the night temperature should be kept at about 65°, raising the heat to 70° on dull days, with an increase to 80° or 85° by sun heat.

It is during this month when careless stoking or firing is liable to cause serious mischief. The nights are frequently cold and rather hard firing is resorted to if the temperature is to be kept up to its normal height; but unless the precaution is taken on bright mornings in checking the fires, a combination of fire heat and sun heat will raise the temperature, and dry the atmosphere to a most injurious extent. One result of this kind of over-heating is a bad attack of red spider and thrips, crotons in particular losing many of their leaves and becoming stunted in growth in consequence. Towards the end of March it may be found desirable to run down the blinds during the hottest part of the day, a chink of top air also being given for about two hours, closing early in the afternoon to box up some of the sun heat. Drawing the blinds down during sharp frosty nights prevents radiation of heat and saves fuel.

Late in April may see a further rise of 3° to 5° in the temperature all round, and the ventilation and shading must be given earlier and taken off later, or, say, at about 3 P.M. If the day temperature reaches 90° no harm will result provided it is accompanied by atmospheric moisture. The air during this and the next month must be changed principally through the top ventilators, currents of cold air through the front sashes having an injurious effect upon the delicate plants with which it comes into contact.

Late in May the summer quarter may be said to commence, and a further increase in temperature is safe and beneficial. The night temperature, with the aid of fire heat, ought to be near 70° by night, though a slight variation either way, according to external conditions, is not harmful. When the hotter weather of June and July is experienced, from 75° to 80° by night will not be found too hot, and is preferable to a lower temperature brought about by either an early cessation of fire heat or excessive ventilation. Strong, healthy growth of plants will be further promoted by the maintenance of a correspondingly high day temperature, this ranging from 75° to 85° or 90° with sun heat and air. With the aid of blinds or other shading material it ought to be possible to keep the temperature at the figures named without opening any side ventilators, unless there are sliding shutters under the front staging, so that the air passes over the hot-water pipes, and becomes tempered before it reaches the plants. It is only during the hottest part of July and August that fire heat may be wholly dispensed with.

September or the commencement of autumn should see the completion of the ripening and solidifying of the growth of the majority of stove plants, an important process which was well commenced by the admission of more air in August. In September the temperature may be lowered somewhat, or about 5° all round, and less atmospheric moisture maintained. From 65° by night to 70° by day, with an occasional fall of 5° on cold nights or dull cold days, answers well throughout the rest of the winter. There is no real necessity to strictly maintain a certain fixed temperature, and a slight fall is better for the plants than the costly attempt to force up the heat by hard firing.

During the late autumn and winter months is, or ought to be, the resting period of most stove plants, and every care should be taken to avoid exciting them into growth at unseasonable times. All the light and sunshine possible should reach the plants during the dullest period of the year. Where the old-fashioned glazing still prevails it may be necessary to open the top ventilators on warm, sunny days to check feeble growth, but there is not much need for this in the case of roofs in which little wood and much glass is to be seen.

The temperatures for the more mixed houses, or what are termed cooler stoves, should be from 5° to 10° lower all the year round than those recommended for the hotter stoves, but in all other respects the foregoing remarks are equally applicable.

Watering and Syringing.

When to apply and when to withhold water will be mentioned in connection with the cultural hints recommended for the various kinds of plants taken in detail, but a few general remarks will not be out of place here, for no subject is more important. A too free use of the watering-pot is particularly to be guarded against in the spring, or directly after many of the plants have been repotted. Enough water must be given to keep the old ball of soil and roots steadily moist, but care must be taken not to saturate and sour the new soil, as this completely unfits it for the reception of delicate root-fibres. If the old soil is moist, as it ought to be when a fresh pot is given to a plant, and the new compost is also moist enough for compression, there ought to be no necessity to apply water for a week other than what the plants may derive from the daily syringings.

Plunging the pots in a bed of moist heating material, such as spent tanners' bark, or good oak leaves, obviates the necessity for early watering, and stimulates the quick formation of root-fibres. So also does plunging in a bed of cocoa-nut fibre refuse, or ashes over bottom-heat pipes, especially if the precaution is taken to keep the plunging material well moistened throughout.

If the pots have to be arranged on a slate-covered stage or bench, cover the slate with a good thickness of sweet ashes, crushed spar, or shells, and keep these moist. This can be done and the plants benefited by freely syringing among the pots in the morning and again early in the afternoon. Open lattice staging over hot-water pipes is prejudicial to the plants.

Before the new soil becomes dust dry apply sufficient water through a rose to well moisten it throughout, and continue to exercise caution against an excess of water till new roots have become plentiful near the sides of the pots. When once this stage has been reached, water must be given more freely and the loss of numerous root-fibres which may result from neglect, or excessive dryness, will be prevented. Many stove plants are strong-rooted and very gross feeders. These, when well established in their pots, ought not only to have abundance of water, twice a day sometimes, but should also be assisted by liquid manure, applied somewhat weak and often, rather than strong at longer intervals. Great judgment is required in watering plants with their pots plunged in moist materials, of the nature previously indicated; such plants are liable to be over-watered, for the simple reason that no moisture evaporates from the sides of the pots. What, therefore, may be of good service in starting plants into vigorous growth may eventually become the cause of their failing to sustain healthy progress.

All through the spring, autumn, and winter months the watering is best done in the morning, and the plants ought then to go through the day without requiring further attention, as far as supplying moisture to the roots is concerned. In hotter weather, or when the days are long, it is advisable to examine all the plants both morning and evening, or some of them may suffer by want of water. Having to water plants flagging under mid-day sun is a misfortune, and should only be resorted to in cases of neglect as the lesser of two evils. They should be supplied with moisture to prevent flagging.

The temperature of the water ought always to be nearly or quite as high as that of the house in which it is used. Although hard water is not necessarily injurious, soft water is preferable, especially when it is warmed by exposure in tanks in the house where the plants are growing. Drawing water out of hot-water pipes for mixing with, and taking the chill off, cold water is a common but bad practice, and should be avoided as much as possible.

The syringe in the hands of a man who has the welfare of the plants under his charge at heart, is capable of doing good service. It ought not to be a case of recklessly deluging the various occupants of a stove, but rather of judicious spraying or dewing. Dashing water forcibly into plants may get rid of some of the insects on them, but it may do more harm to the delicate leaves than an ordinary observer would detect. There are other and better ways of keeping plants clean. Imitate nature's method of invigorating plants through their leaves, and supply them with dew rather than a storm of rain. Plants with hairy or woolly leaves ought not to be syringed, but only the pots and stages on which they are arranged.

The spraying or syringing of plants is best done early in the afternoon, or when the house is closed for the day. If deferred much later the moisture will hang about them through the night, this having a softening and weakening effect upon the stems of some plants and the leaves of others. On dull days during the growing season not much water ought to be distributed about the house, but on clear days the floors and stages may be frequently damped with advantage; and especially all surfaces near the hot-water pipes. This is for providing the requisite moisture in the atmosphere, but, as previously hinted, less of this is needed in the autumn, and still less during the winter.

POTTING.

The best time to repot plants is, as a rule, just when they commence forming fresh root-fibres, consequent upon an increase of temperature in early spring. At this period of their growth many of them will not receive a severe check from the operation; several plants bear a free reduction of their roots after they are shaken nearly clear of the old exhausted soil. Then if they are returned to pots a size smaller than they were in previously, and subsequently given a shift if thought desirable, large healthy plants, in comparatively small pots, will be the result. Crotons, allamandas, bougainvilleas, and a few other kinds are usually rested and dried off during the winter, pruning following early in February; immediately these pruned plants are pushing forth fresh shoots is the best time to repot. Too often, however, the operation is deferred till the young shoots are as forward as those shown on the allamanda, *a*, next page. When thus forward, and the roots are shaken nearly free of the old soil, these, and consequently the top-growth, receive such a severe check that the recovery is slow and unsatisfactory, a feeble, non-flowering—instead of a strong, floriferous—growth resulting. Then again, the mistake is often made of shaking the roots clear of the old soil and repotting without shortening them, the roots also being cramped up in a bunch, as shown at *b* (Fig. 120). Sinking the stem of the plants too deeply in the soil, as shown, is another common blunder. It should be further added that more room has been allowed this plant than it required when first repotted, while the drainage (*c*) is insufficient.

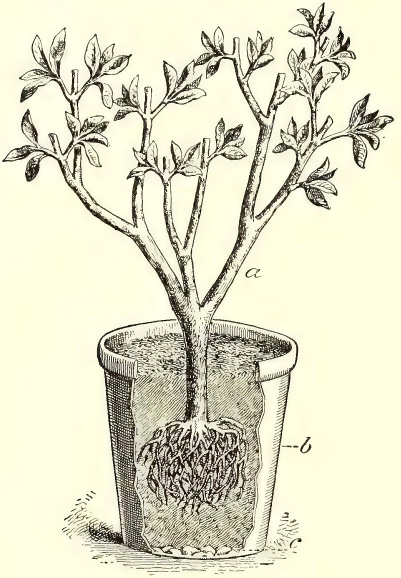

Fig. 120. Faulty Potting.
References:—*a*, growth too advanced; *b*, roots bundled and too deep; *c*, drainage insufficient.

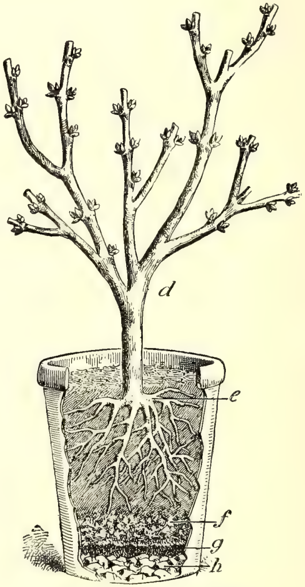

Fig. 121. Correct Potting.
References:—*d*, growth at right stage; *e*, collar at right depth; *f*, turfy soil; *g*, moss to protect drainage (*h*).

The plant *d*, Fig. 121, is in the right state of forwardness for repotting. In this condition top-growth is not advanced enough to suffer from the temporary cutting off of supplies from the roots, and the roots themselves are only just on the move. After such a plant has had its roots nearly cleared of soil, they should be pruned, and then returned to a well-drained pot just large enough to hold them comfortably. The roots ought to be distributed evenly throughout the soil, much as shown in the illustration, by working the plant up and down as fine soil is added, keeping the collar (*e*), only slightly below the soil. This should be pressed down rather firmly, leaving adequate space from the surface to the pot's rim for watering. Plants of a leafy character, of which the well-known marantas may be given as an instance, ought also to be shaken nearly clear of soil just when they are on the point of pushing fresh growths from the root-stock, repotting much as advised in the case of those of a shrubby nature. In every case when the roots are evenly and thinly distributed throughout the soil, they quickly become established. The wounds made by pruning with a sharp knife soon heal and produce root-fibres innumerable in a few days.

It is important that the pots used in all cases be clean and well drained. If quite new first soak them for twenty minutes in a tub of water, as new pots are liable to absorb moisture unduly from the fresh soil; the pots must not be used in a wet state. It is with the larger-sized pots that the most pains should be taken in draining. One large convex crock should be inverted over the drainage hole, on this placing an even, well-arranged layer of medium-sized potsherds, finishing with a few smaller ones. If good moss can be procured, distribute a thin layer of this over the crocks; fibre from which soil is shaken from turves, and half-decayed leaves, are also used. Nearly rotten manure should be avoided, as also should raw broken bones for drainage. Over the drainage, distribute a little of the roughest of the compost, just covering this with fine soil, afterwards proceeding as above advised.

As regards the soil used no particular mixture can be considered right for all kinds of stove plants, any more than for occupants of greenhouses. What each requires will be duly set forth as the different kinds are treated upon, but one rule holds good in all cases: never employ soil much lower in temperature than the house in which the plants to be repotted are growing. It would, if used, have a most chilling effect on the roots. Warming soil over boilers or against hot-water pipes is a slow method, and not the best generally available, as it dries it too much, also making it crumble more than desirable. Hot bricks plunged in a heap of soil quickly warm it through without unduly drying it, and that is by far the best method. The soil ought to be just dry enough to admit of its being packed about the roots firmly, yet not so dry as to require watering the same day as used. Very wet soil must also be avoided. Repotted stove plants should be returned to brisk heat and a moist atmosphere, deferring watering for a few days.

During February or March some of the smaller unpruned, strong-growing plants may be shifted into larger-sized pots, without undergoing the ordeal of having much of the soil shaken clear of, or picked away from, their roots. Among these, probably, will be found a few in an unhealthy state, possibly through sour soil. These should have the roots washed nearly, or quite, free of soil, afterwards cutting away the dead portions and returning to pots just large enough to hold them, using fresh, sweet soil. Later on a shift ought to be given to most of those plants that were pruned, shaken out, and repotted earlier in the season, otherwise the majority may fail to continue growing healthily.

When the roots become closely matted together, as in the case of the broad-leaved croton shown in Fig. 122, before a shift is given, fresh root-fibres are very slow in taking possession of the new soil. Failing to give a sufficiently large shift, and also to allow enough room for watering purposes, are mistakes to be avoided. Should the new soil not be properly packed round the sides of the old ball, the water will draw away from the latter, and the plant cannot flourish.

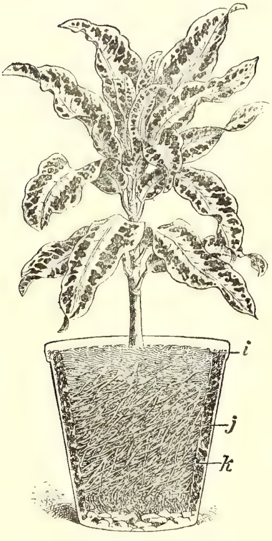

Fig. 122. Repotting (improper).
References: i, pot too full (insufficient space for watering); *j*, roots too matted; *k*, insufficient space for fresh soil; drainage inadequate.

The shift ought, where possible, to be given when the roots are in the condition shown by the croton in Fig. 123. In this instance the roots are plentiful, but as they are not badly matted together, they can be further loosened, and unoccupied top soil picked away with a pointed stick, while the drainage crocks can be removed and the roots among and about them uncoiled. The drainage should be proportionate with the size of the pot and the nature of the plant to occupy it. A small mound of soil may be formed on the moss-covered drainage, this just fitting the hollow in the ball caused by the removal of the crocks, and if properly set on this the loosened roots should spread over it, as shown in the illustration. The soil ought to be placed round the side in instalments, making it firm, according to the nature of the roots to occupy it, those most fibrous-rooted requiring the most solid root run, finishing the surface neatly, and allowing the depth of the rim or more for watering purposes. When the plants are moist at the roots, as they always ought to be before they are turned out of their pots, and are prepared for, and given, a shift as advised, extension roots quickly take possession of the new soil, and the progress of the plants, if other conditions are favourable, will be satisfactory.

INSECT PESTS.

Unless stove plants can be kept free from insect pests, the best of soil cannot produce healthy plants. Under the favourable conditions that they find in heated structures, certain insect pests will inevitably increase in the absence of prevention or repressive measures.

Mealy Bug (*Coccus adonidum*).—This is, perhaps, the worst pest to combat of all. The female is a broad, flattened insect, with short legs, and protected with a mealy or cottony substance, while the males are small-winged insects, quite minute. Once well established in a stove or warm greenhouse the mealy bug is very difficult to eradicate. Fumigating with tobacco is of little avail, but the "X. L. All" Nicotine Vaporizer destroys some of the insects, without, however, damaging the eggs. Methylated spirits, petroleum, as well as other insecticides, if used strong enough to kill the insects, may also injure some of the plants operated upon. Experimental tests are advised prior to general application.

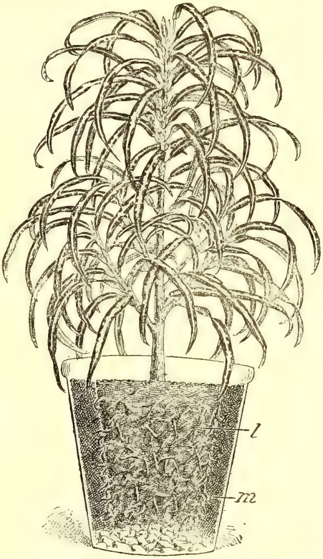

Fig. 123. Repotting (proper).
References: *l*, roots free, with space above for watering; *m*, adequate room for fresh soil; drainage adequate.

Smooth-leaved, moderately hard-wooded plants, such as crotons, ixoras, stephanotes, and gardenias, may be cleared of mealy bug by means of hot-water, soft soap, and petroleum. The water should be heated to about 120°, and in 3 gallons of this dissolve a lump of soft soap about the size of a hen's egg, after which add 6 ozs. of petroleum, measured with the aid of an 8-oz. medicine bottle. Mix thoroughly, and apply with a syringe, forcing every second syringeful into the can. Unless this precaution is taken the oil will collect on the surface, and, as a consequence, some portion of the plant or plants operated on may receive too much of it and be ruined, and the rest not enough to destroy the enemy. This petroleum mixture does little or no harm to the roots if some of it filters through the soil to them, but where possible the plants should be laid on their sides and have the preparation driven forcibly into them, in particular searching out all joints and crevices. A close look out should be kept for what few bugs survive the ordeal, and these disposed of, clean plants may be expected.

Any plants syringed or sponged with petroleum mixtures ought to be carefully shaded from bright sunshine for a few days, as they are liable to injury if exposed. Wood-work, and all places where mealy bug may be lurking, ought also to have a thorough cleansing with the hot-water, soap, and petroleum mixture, but none of it, nor any other strong insecticide, must fall on hairy-leaved plants, including gesneras, achimines, gloxinias, and coleuses, nor ought the smooth, succulent leaves of eucharises, pancratiums, or clivias to be either syringed or sponged with petroleum or other bug-killing mixtures, or serious damage may be done.

Strong insecticides are also injurious to dipaldenias, a genus peculiarly liable to an attack of mealy bug. All these ought to be hand-cleaned, a sponge and hot soapy water, with a small stiff brush for the joints, answering well. Much can be done towards keeping smooth-leaved plants, including eucharises, clean by frequent hard syringings, with water impregnated with soot. A bushel bag of soot is kept covered with water in a small tank or tub, and just enough taken out and added to the syringing water to make this the colour of weak tea. Soot is an insecticide as well as a good fertilizer. Whatever remedy is adopted, it is of the greatest importance that it be persevered with. Only let a few solitary eggs hatch out, the resulting bug having a little law, and the plants will soon be in as filthy a state as ever.

Scale Insects (various species).—Some of these are nearly allied to the mealy bug, only in their case the female insects are protected by white or brown scale coverings, and when they reach the full-grown stage become stationary. They are not nearly so troublesome to cultivators of stove plants as they are to fruit growers, but if they once get the upper hand on stephanotis, gardenias, dracænas, and a few other plants, they are very difficult to eradicate. The remedies are exactly the same as are found efficacious against mealy bug.

Thrips (numerous species) are liable to infest and seriously injure a great variety of stove and greenhouse plants. They are very minute, much longer than they are broad, of a dirty white colour when young, brown or black when fully grown, and very active at all times. Tobacco fumigations persevered with, and also either syringing with or dipping in a strong solution of soft soap and tobacco water, were at one time the best remedies, but nicotine vapour, already alluded to, is both safer and more effective if persevered with, as a remedy for either thrips, green and black fly (Aphides), or the white fly (Aleyrodes).

RED SPIDER (*Tetranychus telarius*).—The smallest of insect pests, but by no means to be overlooked on that account; it ought not to make much headway in plant stoves in which the syringe is freely used and the atmosphere kept constantly moist during the greater part of the year. Dry heat often leads to an attack of red spider, as well as favours the spread of other insect pests. Stages over hot-water pipes ought to be kept covered with slates, and these with either ashes, spar, or fresh moss; then if this material is frequently moistened, a damp, instead of a dry, heat will be constantly rising. Sponging with one of the various insecticides advertised, or with soapy water and sulphur, is of good service, especially in the autumn and early winter months, while syringing with clear soot or sulphur water are good deterrents. If the flowers of sulphur are first made into a paste the mixing will be more complete; or a good handful of it may be squeezed through a canvas or muslin bag into a 3-gallon can of water, and so applied with a syringe.

In respect to insects generally, no matter what they are, or the plants which may be attacked by them, it is impossible to emphasize too strongly the enormous importance of watchfulness for the first comers. It should never be forgotten that when one or two insects are seen, there are others, and probably many, also present, but not apparent. No greater mistake can be made than refraining from destroying the first few invaders; they may be the progenitors of millions and therefore ought to be promptly destroyed, as the most certain and sure way of preventing anxiety to cultivators, cost to proprietors, and injury, if not ruin, to plants.

PLANTS FOR STOVES.

Many and various are the plants from much warmer climes than our own which are cultivated, for decorative purposes, in adequately heated structures in this country. Some of these plants are beautiful because of their handsome foliage and stateliness or elegance in habit, while others are grown because of the charms of their flowers. Happily stove plants are not difficult to grow, but on the contrary comparatively easy, provided their requirements are met as regards temperature, moisture, sun and shade, appropriate to the different kinds. This information, founded on practice in every case, will be given as applicable to plants which are regarded as the more important in the tropical section and obtainable from nurserymen. Plants of extreme rarity, or botanical curiosities, do not come within the scope of an essentially practical work of this nature.

SELECTIONS OF STOVE PLANTS.

ACALYPHA.—A small family, but the few species are well worthy of cultivation in most plant stoves. They are showy by their bold bright leafage, and being easily propagated, also quickly grown to a serviceable size, they are largely used for house decoration. A. macrophylla has large, russet-brown leaves, handsomely blotched with paler spots. A. musaica, the best-known species, has large, bronzy-green leaves, variegated with orange and dull red. A. Wilkesiana (syn. tricolor) forms fine bold leaves, ground colour coppery-green, curiously blotched, mottled and splashed with red and crimson; there is also an attractive variety of it, named marginata. Both the tops of shoots and short lengths of moderately firm wood inserted during April, in sandy soil, and placed in a temperature of about 80°, emit roots freely. Place the rooted cuttings in 3-inch pots, and keep them growing in brisk heat. Top once or twice to make the plants branch, and before they become root-bound shift into 6-inch pots, using a compost of equal parts loam, leaf soil, peat and sand. Single-stemmed plants in various sizes are perhaps the more generally useful for house decoration. If larger are needed, top the plants when young. From three to five strong growths are ample for the first year. During the summer the plants should have abundance of water and liquid manure, and they may be kept fresh and ornamental all through the winter. Reduce the supply of water in January, and the plants may then be cut back severely in February or March. When fresh shoots are forming, shake the roots nearly free of the old soil, trim them and repot, using sizes just large enough to hold the roots. When growing strongly, assign the plants a light position and afford them ample room, as much of their beauty is lost when crowding is permitted. If given a timely shift, large specimens should be produced in the summer.

ACHIMENES.

Achimenes have long been popular, and fully deserve the praise bestowed upon them. Although usually classed as stove plants, they are most successfully grown in the cooler compartments, and several of them flourish in warm greenhouses. Propagation is effected by means of cuttings, or the tops of growing plants, taken off with a view to making the latter branch, duly inserted in sandy peat soil, and given the benefit of brisk bottom heat, produce roots quickly, and develop into flowering plants the same season. Fully grown leaves, inserted to the full depth of their petioles in pans of sandy peat, and treated similarly to cuttings, also develop into plants, only more slowly than in the case of cuttings. Seeds may be sown in March on the surface of pans of fine sandy peat, made firm, level, and moist, placing them on hot beds, covering the pans with squares of glass and shading heavily till the tiny plants are seen. On no account disturb the germinating seed by careless watering, but the soil ought to be re-moistened as often as may be needed by partially immersing the pans in tubs or tanks of warm water. Shade the delicate seedlings from bright sunshine, and when they are large enough to handle, dib them in pans, using the mixture above mentioned. The young plants should be kept growing without check till the autumn, when water ought to be gradually withheld, the tops then dying down, though not before the plants have formed small scaly tubers in the soil. Rest them by keeping the soil dry in a temperature of about 50°. When the plants become strong they produce many tubers, and from these strong flowering plants are obtained the same season in which they are placed in pots, pans, or baskets for the purpose.

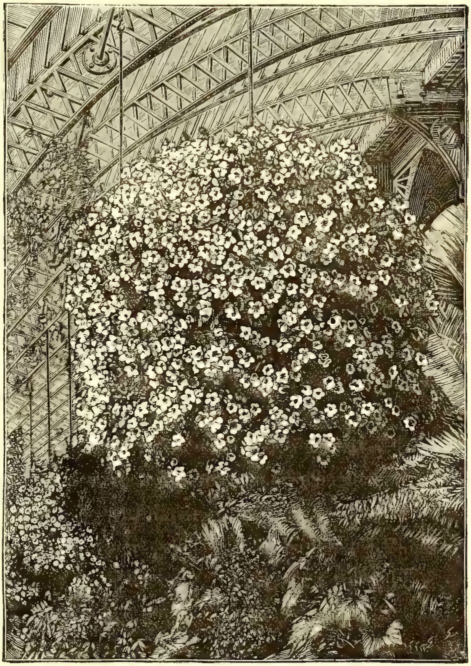

Fig. 124. Achimenes in a basket.

A long succession of flowers extending from April to August, inclusive, is best obtained by starting a number of tubers into growth at different times, commencing, say, in February and finishing late in April. As they are liable to start into growth irregularly, cultivators will do well to "make up" their pots, pans, or hanging baskets in which the plants are desired to flower. The old dry balls of soil should be carefully separated, the tubercles picked out, and placed an inch or so apart, and covered in pans or well-drained 6-inch pots of sandy peat soil. Start them in a temperature of 60° to 65°, and do not give much water till top-growth has well commenced. When the shoots are about 2 inches high the time has arrived for grading the plants into sizes, and transplanting them in their flowering receptacles. Achimenes succeed well and are very effective in deep pans as well as in hanging baskets, and are frequently seen in good condition growing in 5-inch or slightly larger pots. In every case the drainage should be good.

A suitable compost is formed by a mixture of equal parts of fibrous loam, peat, and leaf soil, with a liberal addition of sharp sand and well-decayed manure, warmed through prior to using. Move the small plants carefully out of the pans they were started in, and replant about 2 inches apart, arranging them according to their height and vigour. If somewhat scarce they may be spread out more thinly and topped soon after they have become well established in the fresh soil, this causing them to branch freely. After repotting, assign the plants in a light position, not far from the glass, and shade them, also at all other times, from strong sunshine. Keep the soil uniformly moist, but not saturated, increasing the supply of water with advancing growth. Up to the flowering period syringe morning and evening, a moist atmosphere favouring healthy growth. When the plants have filled the soil with roots apply water freely, varying this with weak, clear, liquid manure. Support the growths with neat hazel stakes and flower the plants after May in a greenhouse or conservatory. When the flowering is over, gradually withhold water from the roots, and during the winter store the pots or pans on their sides out of the way of drip in a warm greenhouse.

When grown in baskets little or no staking is required. A few of the central growths may, or may not, have supports to keep them upright; but the majority should fall gracefully down and form, as they will under good management, charming floral tresses. The baskets employed must be firmly lined with moss, and particular care taken that the soil is not once allowed to become too dry, at the same time guarding against excessive wetness in the early stages of growth. When the plants are in full vigour they will be likely to need much water in their suspended receptacles, and occasional applications of perfectly clear soot water, of the colour of the palest of pale ale, will act beneficially. How beautiful Achimenes are when well grown in baskets may be seen by the representation (page 267) of one of many similar examples produced under the directions of Mr. Owen Thomas, Her Majesty's chief gardener at Windsor.

Although the original species of Achimenes from Jamaica, Guatemala, and Mexico are very beautiful, they are gradually going out of cultivation, as they are eclipsed by the many hybrid varieties raised in this country and on the Continent. Some of the best of these are named below, a selection of twelve being prefixed by an asterisk :—

Varieties for Cultivation.

Admiration.—Deep rose, white throat, spotted with carmine.
* Ambroise Verschaffelt.—Large pure white flowers, with a dark-rayed centre.
* Argus.—Rich plum, deep orange eye, flowers large and freely produced.
Carl Woolfarth.—Deep crimson ; very free.
* carminata splendens.—Bright rose yellow, spotted in the centre ; very attractive.
Dazzle.—Flowers small, brilliant scarlet, pale yellow eye ; floriferous.
Diadem.—Crimson lake, shaded carmine, with deep yellow eye.
Excelsior.—Rich violet-purple, large and free ; habit compact.
* Firefly.—Deep carmine red, golden eye ; popular.
Gibsoni.—Flowers very large, clear mauve, with the tube white outside.
gloxiniæflora.—Large gloxinia-like flowers, whitish ; lobes dotted with purple.
grandiflora.—Very large flowers, violet purple ; habit good.
* Harry Williams.—Bright cerise-red, yellow, maroon spotted, edge prettily fringed.
* longiflora alba.—Large white flowers, good habit ; one of the best.
* longiflora major.—Very large rich blue flowers, the finest of the colour.
Loveliness.—Rich magenta crimson.
* Madame A. Verschaffelt.—Flowers large, pure white ground, veined with purple.
* Magnet.—Deep orange, spotted with crimson, with a carmine zone ; very free.
* Mauve Queen.—Large flowers, mauve, with a brownish eyeshade ; good habit.
Margaretta.—Medium-sized flowers, pure white.
multiflora.—Pale lilac, very free.
purpurea elegans.—Deep claret purple ; dark spots.
Rollisoni.—Deep lavender blue, large flowers.
* rosea magnifica.—Bright rose, with a yellow eye ; very beautiful.
Rose Queen.—Rich rosy lake-shaded purple, with orange throat.
Scarlet Perfection.—Rich carmine scarlet.
Sir T. Thomas.—Deep crimson-lake, very free flowering ; of good habit.
Unique.—Rosy-pink, deep yellow eye, spotted crimson ; attractive.
vivicans.—Dark crimson-purple, with crimson eye ; floriferous.
* Williamsi.—Large flowers, brilliant scarlet, orange throat ; habit good.

ÆCHMEA.—These are included among what may be termed old-fashioned stove plants, and are not often met with in good condition. Eighteen species are described in encyclopædias, but these may be usefully narrowed down to three for general cultivation, namely, Æ. discolor (Brazil), which produces loose branching panicles of scarlet flowers early in the summer, these attaining a height of 2 feet ; Æ. fulgens (Cayenne) produces in the same way deep rich red flowers in August ; while Æ. Mariæ Reginæ (Costa Rica) is the most distinct and beautiful. In this instance the flowers are tipped with blue, changing to salmon colour with age, and are arranged in a compact spike on a long flower scape, half the length of which is clothed with boat-shaped bracts of a rich rosy-pink colour. After strong young plants have flowered they produce small sucker growths from the base, and these should be taken off and rooted for flowering the following season. They ought to be cleared of their short lower leaves, and trimmed with a sharp knife prior to inserting them firmly and singly in small pots of sandy peat soil. Plunge the pots in or arrange them on a hot-bed, and be careful not to over-water. When well rooted shift the plants into well-drained 6-inch pots, using a mixture of fibrous loam, peat, and leaf soil in equal parts, with a free addition of sharp sand. Pot firmly. The plants ought never to be crowded among, or over-shadowed by, a variety of others, but raised well up to the light. Partial rest should be enforced during the winter, not by lowering the temperature, but by giving less water than previously. Water ought not to stand in the crowns at any time, as this is liable to damage the hearts. If large specimens are desired a shift may be given the old plants soon after flowering, but the best results attend the practice of annually raising a fresh stock and throwing the old plants away.

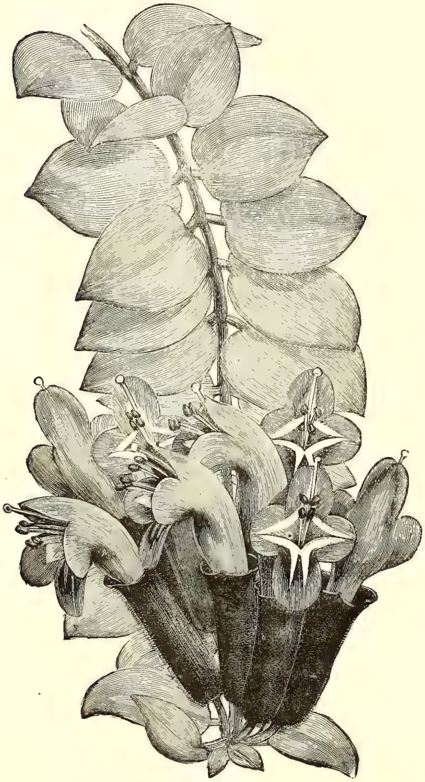
Fig. 125. Æschynanthus tricolor.

ÆSCHYNANTHUS. — Few plants are more attractive when suspended in warm stoves than Æschynanthus. They are not particularly well adapted for affording a supply of cut flowers, and that is the reason probably why fewer of them are grown than formerly. All are summer-flowering, and the best-known species are Æ. Boschiana (Java), scarlet; Æ. grandiflora (East Indies), deep crimson and orange; Æ. Lobbiana (Java), rich scarlet; Æ. longiflora (Java), scarlet; Æ. pulcher (Java), bright scarlet; Æ. speciosa (Java), rich orange; and Æ. tricolor (Borneo), scarlet, streaked with orange and black (Fig. 125). Propagation is effected by cuttings

3 inches long, of half-ripened wood, taken in February, and inserted in sandy peat. A bottom heat of about 80° is desirable, and the cuttings should be covered with a bell glass. When well rooted let the plants be placed singly in small pots, in a glazed case in the stove, till they are established. The following February or March shift them into their flowering quarters. A portion of the plants may be fastened to blocks, enclosing the roots in a mixture of peat, sphagnum moss, sand, and charcoal, covering this with more of the sphagnum, and keeping all together with the aid of copper wire. Suspending baskets are more often used. These should be firmly lined with fresh moss, and filled with a compost similar to that recommended for blocks, only rather coarser. One or several plants may be placed in each basket, and the subsequent attention needed is to peg down the trailing growths to the soil or moss till a good even mass has been formed. Removing the flowers directly they show on small plants tends to promote stronger growth. During the summer the plants must be kept uniformly moist at the roots, occasionally dipping the baskets in tubs of tepid water, frequent syringings being also required. If kept cooler and drier during the winter they will flower grandly the following summer.

AGALMYLA.—The only species in this small family of gesneracæous plants recommended for cultivation in stoves is A. staminia, a native of Java. It is of a trailing habit of growth, admirably adapted for growing in hanging baskets, flowering in the summer; flowers scarlet in axillary fascicles. It is increased by cuttings of firm shoots under a bell glass, in a temperature of 80° in July or August. The treatment, including the soil recommended for Æschynanthus, applies equally well to Agalmyla.

AGLAONEMA.—Not many of these are grown. They are nearly allied to *Arum*, and might easily be mistaken for members of that family. A. pictum, Borneo, is most generally grown. This species has green leaves blotched with grey, and produces creamy yellow spathes in August. May be increased by division just when new growth is commencing in the spring. Use well-drained pots and a compost of rough fibrous loam, leaf soil, a little decayed manure, and coarse sand. A somewhat shady position suits the plants, and they should have abundance of water when growing and flowering, but during the winter they ought to be kept rather dry at the roots.

ALLAMANDA.

Very few stove plants are better known or more deservedly popular than Allamandas. They are indispensable to the exhibitor of stove and greenhouse plants, and even more attractive and beautiful when treated as roof plants. It is no uncommon occurrence for such plants to flower profusely from May to September, inclusive, with a good sprinkling of their handsome soft yellow blooms for another four months.

A. Chelsoni, a garden hybrid, gives large yellow flowers, but is too stiff in growth for trailing over circular trellises, pillars and roofs of houses better suiting it. A. grandiflora, Brazil, yields a profusion of lovely, medium-sized, pale yellow flowers, and is not nearly so coarse in growth as most of the other species. It succeeds best grafted on a stronger-growing species. A. Hendersoni, the most popular species, is one of the best, either for exhibition or for training over roofs; flowers large and bold, rich golden yellow, throat striped with brown. A. nobilis (Fig. 126), Brazil, is not so robust as the preceding, nor so generally serviceable, but is distinct and beautiful. The flowers are very large and of a bright yellow colour. A. nerifolia, a South American species, is very different to any previously described. It is of stiff, shrubby habit of growth, and produces terminal panicles of comparatively small, golden yellow flowers. A. Wardleyana is similar to Hendersoni.

Cuttings of shoots, preferably short tops, taken early in February or at pruning time, inserted singly in the centre of small pots firmly filled with a mixture of fine loam, leaf soil, and sand, plunged in brisk bottom heat, will produce roots in a few weeks, after which the plants should be arranged on the surface of the bed. Before the small pots become crowded with roots shift the plants into 5-inch pots, and return them to the surface of the hot-bed, or an ash-covered slate stage, in brisk heat as before. If wanted for covering a globular trellis, top to make them branch; but if they are to be flowered on the roof, do not top the plants till the trellis is reached. In the meantime another shift will have been required. For the stronger plants 9-inch pots are not too large, as allamandas produce numerous strong roots. For this and all other pottings a mixture of two parts good turfy loam to one of leaf soil, with a little decayed manure and sand, is suitable. For the larger shifts break or chop the fibrous loam up coarsely, and always pot firmly.

Both old and young plants ought to be kept well exposed to the light and sunshine, as this favours the formation of firm floriferous growth, which matures sufficiently for pruning without much resting or the withholding of water at the roots in the autumn or early winter months. The more soft immature ends are not suitable for retention at pruning time. All main or leading growths ought to be well cut back in February, for if this is neglected much of the beauty of the plants will be lost and confusion of growths prevail. Those on globular trellises should be pruned to within one or two joints of where the leading growths last started from, and the roof plants ought to be unhesitatingly shortened with equal severity, or to as near the main stem as can safely be done. Soon after pruning give the plants a thorough soaking of water at the roots, and this coupled with daily syringings, the maintenance of a moist atmosphere, and a temperature of 60° to 70°, will cause them to break strongly. Before the young shoots have made much progress (see Fig. 121, page 260), re-potting, re-tubbing, or re-planting, as the case may be, ought always to take place. Turn them out of the old exhausted soil, leaving only a little of this by way of a "ball," and freely shorten the roots. It should then be decided whether the plants are to be flowered in pots, in tubs, or in pits.

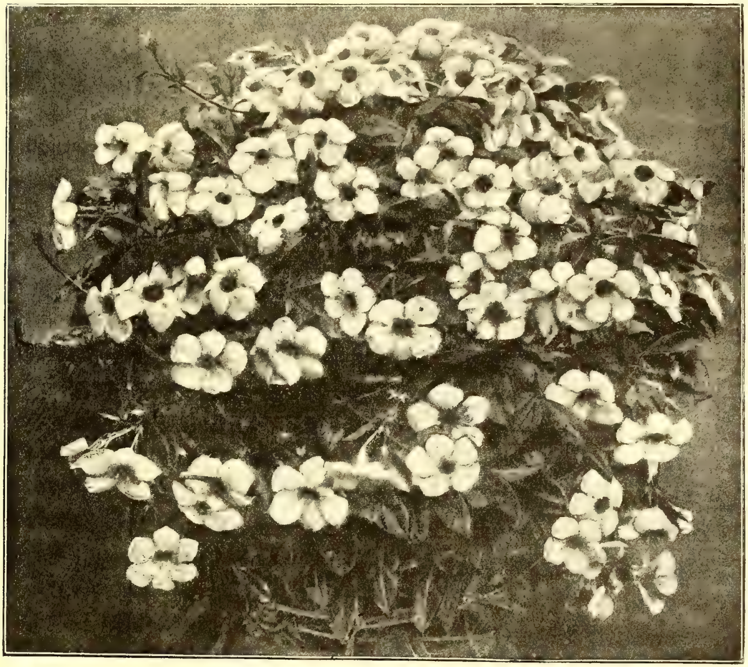

Fig. 126. Allamanda nobilis (as exhibited).

For exhibition purposes pots are to be preferred. Strong plants, or those which have already done good service, may be returned to the same size or slightly larger pots than they were in previously, rather than perform the risky operation of giving a shift during the growing season. Younger plants should be returned to pots just large enough to hold the roots, giving them a shift into pots two sizes larger before they become root-bound.

Allamandas will not flower satisfactorily if trained at a considerable distance from the roof. If wanted for exhibition, raise the pots well up to the glass, top the growths till sufficient are obtained to eventually cover a large globular or balloon-shaped trellis, and train these thinly to wires strained not more than 9 inches from the glass, removing weakly or superfluous side shoots as these form at the points about the flower spikes. When the long growths are taken down train them evenly over the trellises, allowing sufficient time between this important operation and the date of exhibition for the flowers and leaves to assume a more natural position than when first formally trained. Avoid exposing specimen plants to cold winds, as this causes the flowers to flag seriously. A typical exhibition specimen, grown by Mr. C. Lock, is shown in Fig. 126.

The larger sizes of pots will also answer for roof plants, especially if the roots are allowed to ramble out through the drainage into a bed of ashes or soil underneath. Tubs of the same width, but not so deep, may be substituted for pots with advantage, as in this case the plants are less likely to suffer through lack of moisture at the roots during the flowering period. Wood does not absorb moisture from the soil and air to the same extent that pots do, and that is why tubs are best for standing in exposed positions.

Small brick pits are better than either pots or tubs. In one of these 30 inches square and 2 feet deep enough soil can be placed to support a plant covering a superficial roof area of from 15 feet to 20 feet square. The walls of these pits should be 4½ inches wide, and formed with loose bricks only. If the start is made with a much smaller pit than that named, more root room could, if needed, be given the same season by taking down and setting out the wall a brick wider, or this enlargement might be delayed till the next spring. For the first few weeks after re-potting very heavy supplies of water must not be given; infringing this rule leads to souring the soil, which causes the leaves to assume a sickly yellow colour. After the plants have become well established in the fresh soil abundance of water must be given. It is often needed twice a day in hot weather, varied frequently by liquid manure. A mulching of cow manure or an extra rich top-dressing serves to conserve the moisture, and the roots revel in the fresh rich food. Syringe the plants freely early in the afternoon or when the houses are finally closed on hot days, this serving to keep the foliage free of what few insect pests there may be trying to effect a lodgment, and otherwise benefits the plants.

Roof plants may be topped till sufficient leading growths are produced to thinly cover the trellis, after which they should be allowed to spread unrestrictedly beyond the removal of a portion of the shoots which are apt to issue about each flower spike that forms. If the spikes are not cut, many of them will attain a length of 30 inches, and produce flowers throughout the season. It will thus be seen that if allamandas are properly managed a profusion of flowers may be had gracefully depending from the roof for at least six months in the year. Many of these are taken off singly for room or table decoration. Somewhat high temperatures are desirable for the healthy growth of these luxuriant plants and the development of their handsome blooms.

ALOCASIA.

Having regard to the bold beauty of their handsome leaves, when presented in the best condition, these stately tropical plants cannot be overlooked. They are easily grown, but succeed best in the larger stoves, or where a moist atmosphere, in addition to strong heat, can be maintained. It is in the small, crowded, glaring, dry hot-houses where they are most often seen to disadvantage, their half-dried, semi-faded leaves being the reverse of attractive.

Among the more imposing kinds to grow are:—A. cuprea, better known as A metallica, from Borneo. It forms large, ribbed leaves, measuring 12 inches to 18 inches. in length, of a rich bronze colour on the upper surface and purple beneath; A. Chelsoni, a hybrid between A. cuprea and A. longiloba, possesses some of the most marked characteristics of both parents; A. Jenningsi, India, has handsome green leaves, marked with blotches of dark brown; A. longiloba, syn. amabilis and gigantea, Java, attains a height of 4 feet, the long green leaves having silvery veins; A. Lowi, Borneo, forms leaves from 14 inches to 16 inches long, green with thick white ribs, purple underneath; A. macrorhiza, Polynesia, is not worth house room, but the variegated form of it from Ceylon, when properly selected and at its best, is a noble plant; the leaves are blotched and marbled with white, and the footstalks also nearly white; A. Sanderiana is a grand species, with dark leaves and ivory white veins; A. Sanderiana nobilis is an ornate variety with glaucous, dark-green leaves, having prominent white ribs and veins (Fig. 127); and A. Sedeni—a hybrid between A. Lowi and A. cuprea—is also good.

Alocasias are readily increased by division of the underground stems, or rhizomes, in March. If these are started in small pots, and kept growing in brisk moist heat, they soon need more pot-room, and the strongest of the species may be grown from quite small plants into imposing specimens in one season. For the first potting and subsequent shifts use a mixture of very fibrous loam and peat in equal parts, with sphagnum moss, lumps of charcoal, and sharp sand freely incorporated. For the larger

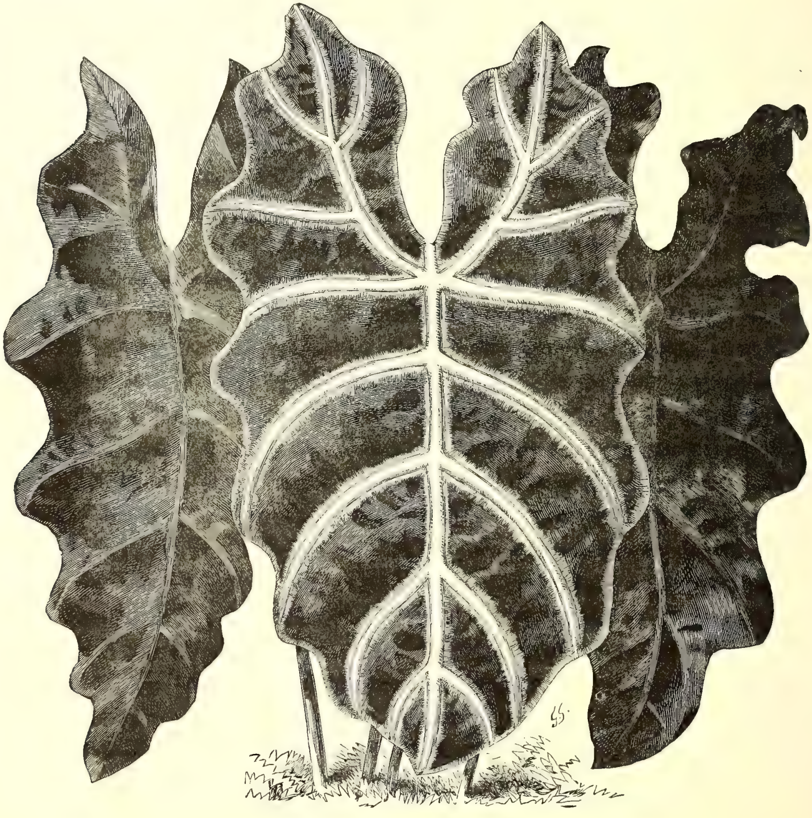

Fig. 127. Alocasia Sanderiana nobilis.

pots chop or break up the loam and peat into large lumps, a fine, close compost not suiting such coarse-rooted plants as alocasias. The choicer species should be raised rather high in the pots, and have the surface of the soil heavily covered, in the form of a mound, with sphagnum moss, this promoting the formation of new roots from the rhizomes. Afford heavy drainage, as abundance of water must be applied during the growing season, with liquid manure occasionally. Shade from bright sun during the spring and summer. A winter temperature of 60° to 65°, increasing to 75° and 85° in the summer, suits alocasias.

AMASONIA PUNICEA.—This beautiful flowering shrub was introduced from British Guinea, and bids fair to become extremely popular. The introducers, Messrs. Veitch & Sons, Chelsea, correctly describe this sterling novelty as follows:—"The inflorescence is very brilliant, being particularly striking from having a series of the richest vermilion-crimson Poinsettia-like spreading bracts, arranged in pairs along the entire length of the racemes, which are a foot long; these bracts, the lowermost of which are 4 inches long, are very persistent, remaining in perfection nearly two months. From the base of each bract are produced pendulous tubular flowers in twos and threes, of a creamy white colour, offering a pleasing contrast to the rich colouring of the other parts of the inflorescence." Propagation is effected by cuttings of young flowerless shoots, not too soft, inserted in light sandy soil, and the pots plunged in damp bottom heat, under a handlight or glazed case in a warm house, shading as may be needed to keep the leaves fresh till roots are emitted, then admitting air gradually prior to potting singly. Before the plants are root-bound they are transferred to 5 or 6-inch pots, in which they may flower, growing them in a light position, in ordinary stove temperature. They succeed under the same cultural treatment as Poinsettias. We are indebted to the introducers of this distinct plant for the characteristic illustration, Fig. 128, next page.

ANANAS OR ANANASSA.—A. sativa is the botanical name of the Pine Apple, and it is the variegated form, A. sativa variegata, that is grown in plant stoves for the beauty of its foliage. It is propagated from suckers which are produced by old plants, and also from neat little offsets and crowns produced with the fruit. These, after being detached, should be laid on a shelf for two or three days to dry, before inserting them singly in small pots. Plunge the pots in a brisk hot bed, and be very careful not to over-water before many roots are formed. Bottom heat is desirable, but not indispensable, when the plants are given a shift, as it also is when older plants are partially shaken clear of the old soil and re-potted in a mixture of two parts fibrous loam and one part each of peat and leaf soil, with a little sharp sand, in March. Clean, well-drained pots should be used, and the soil be made moderately firm. Plants in 6-inch pots are the most serviceable for house decoration, and these colour grandly

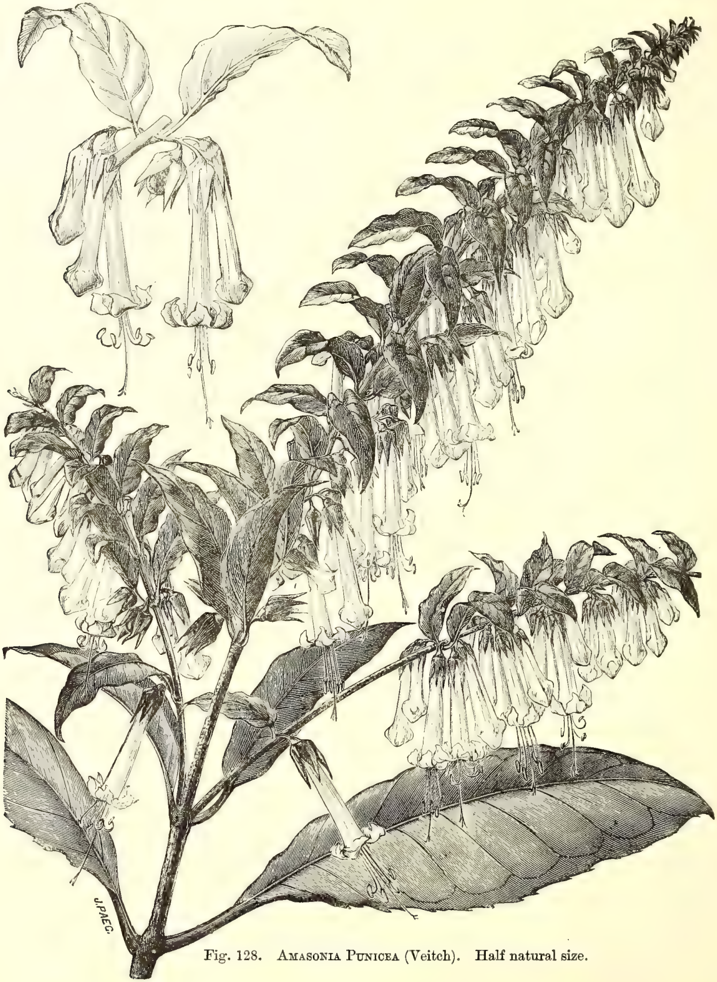

Fig. 128. Amasonia Punicea (Veitch). Half natural size.

when suspended near the glass in strong heat, the arching leaves having a beautiful effect.

ANDROPOGON.—Only one species in this genus of grasses can be recommended for culture in stoves, namely, A. Schœnanthus (Lemon Grass). It is of elegant growth, and the leaves emit a fragrant odour when bruised. Can be propagated either by division or from seeds, and is of the easiest cultivation, loamy soil, moisture, and warmth being the chief requirements.

ANTHURIUM.

This genus comprises many species remarkable for the grandeur of their leaves, whilst several are also well deserving of cultivation for the beauty and quaintness of their inflorescence. A. Andreanum, Columbia, forms long, pointed, green leaves, the plants flowering freely in the spring and early summer months. The spadix is usually 3 inches long, yellowish, with a broad central band of white, and the spathe 4 inches across, 6 inches to 9 inches long, with a corrugated surface, colour orange red. Of this species there are several varieties newly introduced, including :—album, pure white ; delicatum, rose coloured, spathe large and ovate ; Le Flambeau, dark red, fine ; and Thellusoni, an improvement on giganteum. A. crystallinum, Columbia, leaves violet colour in a young state, changing to bright velvety green, the prominent veins elegantly banded with pure crystal white—a handsome-foliaged plant ; A. ferrierense, spathe 5 inches long and 4 inches wide, bright red, spadix erect, 4 inches long, ivory white ; A. Kalbreyeri, New Grenada, a handsome climbing species, with large, deep green leaves ; A. magnificum, fine foliage ; A. regale, East Peru, large leaves, dull metallic green, with white veins ; A. splendidum, A. Veitchi, and A. Warocqueanum are also grown for the grandeur of their leaves, those of Veitchi being 4 to 6 feet long hanging like glistening shields (Fig. 129). A. Scherzerianum, Costa Rica, is perhaps the best-known species, and of this there are several varieties, all more or less improvements on the type. In the original species the spathes are not more than 3 inches long and 2 inches broad, colour bright red, the spadix semi-erect at first and curling later, orange coloured. In Scherzerianum giganteum and Wardi the spathes have been nearly, or quite, doubled in size, and the leaves are also improved considerably in size and appearance. S. Duvivierianum is the best of the white varieties, having spathes nearly as large as the red forms. S. Rothschildianum gives a white spathe spotted and freckled with red, while the spathes of S. parisiense are large and rosy pink in colour (see index for coloured plate).

Anthuriums are not difficult to raise from seed, but the process is slow and the plants are a long time attaining to a flowering or presentable size. Seeds should be sown directly they are ripe, or when they can readily be separated from the pulp in which they are enclosed. Prepare a pan by draining heavily and filling with a mixture of chopped sphagnum, peat, and sand, making this firm and moist. Sow on the surface, and place the pan in a close frame, or cover with a bell glass, where a temperature of 75° to 85° is maintained, accompanied by abundance of moisture. The material in the pans must never once become dry or be exposed to the sun during the twelve months,

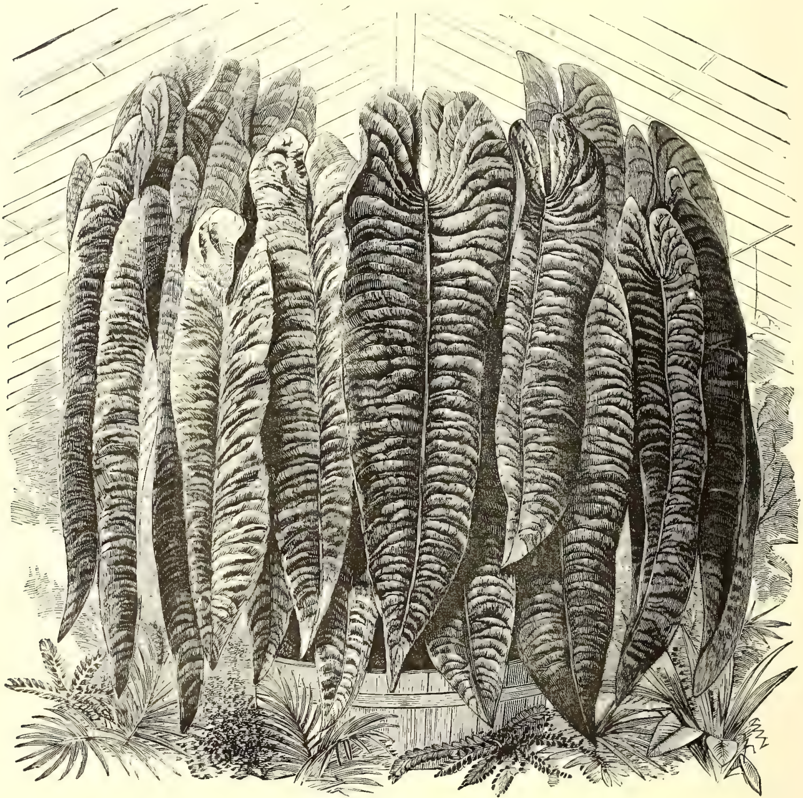

Fig. 129. Anthurium Veitchi.

more or less, that will elapse before germination takes place. When the seedlings are large enough to move, transfer them to other pans prepared as for seed sowing. Insert them carefully in the compost, and keep them close and moist as before till they are well established, when they will bear more exposure to the air. From the pan transfer the plants to well-drained pots just large enough to hold the roots comfortably. For these and the later shifts employ fibrous peat, from which some of the finer portions have been beaten out, two parts, sphagnum moss two parts, superior fibrous loam one part, with sharp sand, broken crocks and charcoal freely intermixed. The larger the pots the coarser should be the compost for the plants.

Division of old plants is the most common method of propagation, and this is best done early in the year. In order to be able to divide them with as little damage to the roots as possible, shake the plants clear of soil and carefully pull them apart, each crown or division having roots attached. Avoid over-potting these divisions, and take good care that the roots are evenly distributed. The compost may be the same as recommended for the seedlings. In every case ample drainage should be provided, while the crowns of the plants ought to be raised well above the rim of the pots, with the soil banked up around them. Finish with a surfacing of fresh sphagnum. Arrange the newly divided plants in a somewhat shady position on a stage that can be kept constantly moist, also keep the plants uniformly moist at the roots, syringing them once or twice daily. A temperature of 60° to 70° answers well at the outset, increasing to 75° or more in hot weather for the benefit of the more tender species. A. Scherzerianum and varieties require less heat than the species grown for the beauty of their leaves, and are frequently seen in excellent condition under what is little better than warm greenhouse treatment.

Established plants should be kept in a moist atmosphere ; also steadily moist at the roots and shaded from bright sunshine. January is the best month to give larger pots to any requiring them. If the roots are found unhealthy, wash them nearly, or quite, clear of soil, cut out all dead portions, and re-pot in fresh compost. Good drainage is imperative, as although anthuriums are moisture-loving plants they will not thrive in sour soil.

APHELANDRA.

Though not commonly cultivated, aphelandras are yet deserving of inclusion in most collections of stove plants. They are of a shrubby nature, and grown for the brilliancy and attractiveness of their terminal four-sided spikes of flowers, which are chiefly produced in the autumn. A. aurantiaca, Mexico, height 3 feet, flowers deep orange scarlet, is one of the best species, and of this A. Roezli is a desirable variety, with brighter scarlet flowers and curiously twisted leaves. A. cristata, West Indies, has brilliant orange-scarlet flowers, continuously produced; A. fascinator, New Grenada, flowers bright vermilion, in large spikes, height 1½ feet; A. nitens, Columbia, flowers glowing vermilion-scarlet, height 2 feet; and A. punctata, South America, flowers bright yellow, leaves variegated, height 2 feet, are also available.

Aphelandras are propagated by cuttings of firm young wood in March or April. Those taken off with a heel of old wood attached emit roots the most freely, but if cut cleanly across below a joint and the lower leaves removed they can be rooted without much difficulty. Insert them firmly in pots of sandy soil, and plunge in brisk bottom heat. When rooted the plants may be given a shift, and if not topped will flower the same season. With a view to forming neat plants for future service, grow them in gentle heat, top once to make them branch, and soon after give them more root room. The soil for this and subsequent pottings may consist of equal parts of fibrous loam, peat, leaf soil, and sand. Pot moderately firm. Both young and old plants should be placed in rather cooler quarters during the winter, or in a temperature 50° to 55°, and only receive water to prevent the wood shrivelling.

In February prune severely, shortening all the strong growths to within two joints of the old wood, cutting the spray clean out, as only strong young shoots flower satisfactorily. Transfer the plants to warmer quarters, give a good soaking of water, and syringe frequently; this will cause them to break freely. Soon after young shoots are formed, turn the plants out of their pots, shake the roots nearly free of soil, prune them and re-pot in sizes just large enough to hold the roots. Keep the plants in a light position, syringe daily, a moist atmosphere suiting aphelandras, and before the roots become matted together give the plants a shift. Do not top them, but the weakly, non-flowering shoots may be removed with advantage. After the flower spikes show, apply liquid manure frequently. The flowers remain fresh for the greatest length of time in a warm, dry atmosphere.

ARALIA.

Among the heat-loving section of this large family are some of the most elegant species of fine-foliaged plants in cultivation. They are admirably adapted alike for effective grouping and for table decoration. Unfortunately the choicest species are not easy to propagate, or far more of them would be grown. A. Chabrieri forms handsome, finely divided leaves which attain a length of 1 foot, deep glossy green, with a heavy crimson mid-rib. A. elegantissima, South Sea Islands, is particularly graceful in appearance, having pendulous digitate leaves, with dark green, white mottled footstalks, borne on light, erect stems. A. filicifolia, Polynesia, has somewhat heavier, fern-like leaves, bright green in colour with a purplish mid-rib; stem and leaf-stalk purplish, with white spots. A. Guilfoylei, South Sea Islands, is free growing, with variegated leaves, and principally valuable as being a good stock for the more elegant, less easily propagated species to be grafted upon. A. Kerchoveana, South Sea Islands, forms digitate leaves circular in outline and freely divided, deep glossy green in colour, with a pale mid-rib. A. leptophylla, comparatively large compound leaves, somewhat pendant in character, and dark green, can be grown successfully in a warm greenhouse. A. reticulata is strap-leaved when young, becoming larger with age, dark green, reticulated with a lighter shade of green. May be grown in a greenhouse or conservatory during the warmest part of the year. A. Veitchi, New Caledonia, in a young state is very elegant, but becomes coarse with age; it forms digitate, filiform undulated leaves, green above, and dark red beneath; petioles long and slender, and a straight, slender stem. A.V. gracillima, South Sea Islands, is by many persons considered the most elegant of all the Aralias. The leaves are alternate, spreading with very narrow leaflets having a prominent ivory white central rib.

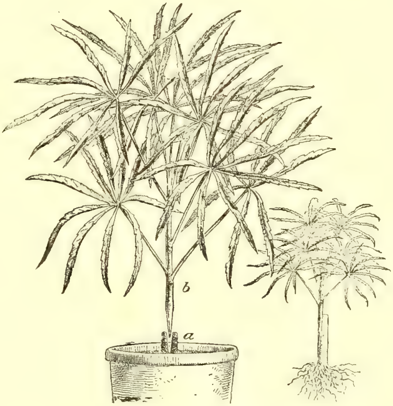

Fig. 130. GRAFTING ARALIAS.

References: *a*, stock cut down and split for the reception of the wedge-cut scion *b*; side grafting, *c*. (See text next page.)

The coarser-leaved varieties can be propagated by means of cuttings, formed of either fleshy roots or short lengths of stems. After washing the roots free of soil, select the stronger of these, detach from the stem, and cut them cleanly across at the thickest part, which is to be the uppermost end when they are inserted in light, sandy peat. Plunge the pots in brisk bottom heat, and cover with squares of glass till shoots appear. When about 1 inch in length, place the plants singly in small pots and stand them on a gentle hot-bed till well established. When old "unworked" stems are cut down to near the soil the roots nearest the surface will in some instances push up shoots, and these can be separated from the parent plant, and treated similarly to those obtained from root cuttings.

If the leafy stems of A. Guilfoylei and A. reticulata are cut up into lengths of 2 inches, inserted deeply in pots of sandy peat, and plunged in a propagative frame or otherwise given the benefit of bottom heat and a close covering of glass, many of them will emit roots. When well established in 3-inch pots these plants are suitable for heading back to within half an inch of the soil, and for grafting with small tops of A. leptophylla, A. Veitchi and A. V. gracillima. The old-fashioned cleft grafting, the stock *a* and scion *b* being prepared as shown in Fig. 130, answers well. In most instances the stock will be found considerably thicker than the scion, and in order to be certain of success in grafting, the inner barks of stock and scion must be fitted together at one side only as shown at *c*, in the figure. Bind neatly with raffia, and cover with grafting wax to exclude the air. Close, moist heat is needed till the union has taken place, after which a light position may be assigned the plants, removing the wax, also the tying material before this cuts into the wood. Shift into 5-inch pots when more root room is needed, using a mixture of loam, peat, and leaf soil in equal parts, adding crushed charcoal and silver sand. Plants obtained from root cuttings and suckers can also, when strong enough, be headed down and grafted.

An ordinary stove temperature suits tropical Aralias; and at no time ought the plants to suffer through want of moisture at the roots. Nor ought they to be unduly exposed to cold winds in the course of transit to a dwelling-house, or while they are kept there, as these occurrences lead to an early loss of the lower leaves and general disfigurement. Crowding the plants among other kinds is also a mistake. Brown scale and mealy bug are very liable to become established on Aralias. Careful sponging with hot soapy water is the safest remedy.

ARDISIA.—Former generations of plant-growers attached more value to the berry-bearing Ardisias than do the present-day gardeners. This loss of popularity is a matter for regret, as, when well grown, they are distinctly ornamental and serviceable fruit-bearing shrubs. A. crenulata, Mexico, produces numerous whorled panicles of white flowers from a single erect stem, and these are followed by clusters of coral-red berries, which not unfrequently remain on the plant till successional crops of berries, higher up the stems, are ripening. The white-berried form, A. c. alba, is much less ornamental, but forms a good companion to the original species. Cuttings of side-shoots, taken in March, can be rooted in a close, warm frame; but the plants obtained in this way are far inferior to those raised from seed. For seed-sowing in February or March, fill well-drained pots or pans with a mixture of loam, peat, and sand; after freeing the new seeds of pulp, press them—thinly—into the soil, and plunge the pots or pans in a moist, mild hot-bed, water, cover with squares of glass, and shade heavily. Germination will be slow. After it has taken place, remove the glass, and gradually inure the plants to the light and air. When about two inches high, place the seedlings singly in 2½-inch pots, making the soil for this, and subsequent shifts, richer than for seed sowing. Keep them close, warm, and lightly shaded; spray frequently with tepid water till they have formed fresh roots, when a light—but not hot and dry—shelf or stage is the best place for them. A timely shift into 5-inch or 6-inch pots must be given; and after the plants have become well established in these—their fruiting pots—a light position in a warm greenhouse is preferable to strong heat. The plants are somewhat coarse-rooted; and when they have well filled their pots with roots, abundance of water should be given, frequently varied with liquid manure. The branches only fruit once; but if long, naked stems are not thought objectionable, the plants may receive an occasional shift, and if otherwise well attended to, will continue to produce flowering and fruiting growths for several years in succession.

ARISTOLOCHIA.—This genus of plants is remarkable for the quaint and extraordinary forms the flowers assume. These, however, are never likely to become popular in a cut state, and where plants are cultivated in stoves it is chiefly in the way of curiosities. A. Duchartrei, syn. A. Ruiziana, Upper Amazons, produces flowers from the old wood in racemes. The tube of the flower is brown; limb, cream colour, with purple blotches. January. Height 5 feet. A. gigas, Guatemala, purple flowers; perianth large, cordate, ribbed outside, reticulated, downy; tube inflated, contracted in the middle, limb large, with a long tail. June. Height 10 feet. A. Goldieana (Fig. 131, next page), Old Calabar, is the finest of the family. Flowers have been seen 26 inches long by 11 inches wide, greenish yellow outside, deep yellow with chocolate veins inside. July. The natives are said to use the flowers for hats. A. tricaudata, Mexico, flowers dark purple brown. August. The stove species of Aristolochias are propagated by inserting cuttings in sandy soil, and covering with a bell glass, in a temperature of 75°. From small pots the plants are gradually shifted into larger, or they may be planted in narrow borders. A mixture of two parts loam to one of leaf soil, with sand, suits them. Train the taller growers round stakes or trellisses not far from the pots at first, this bringing the ends where the flowers are principally produced into the best position for effect. They should have abundance of light and sun. Apply water freely during the growing and flowering season, and reduce the supply considerably in the winter. Prune severely in February, and re-pot when fresh shoots are forming in March. Summer temperature 65° to 75°, resting the plants during the winter in a temperature of 60° to 65°.

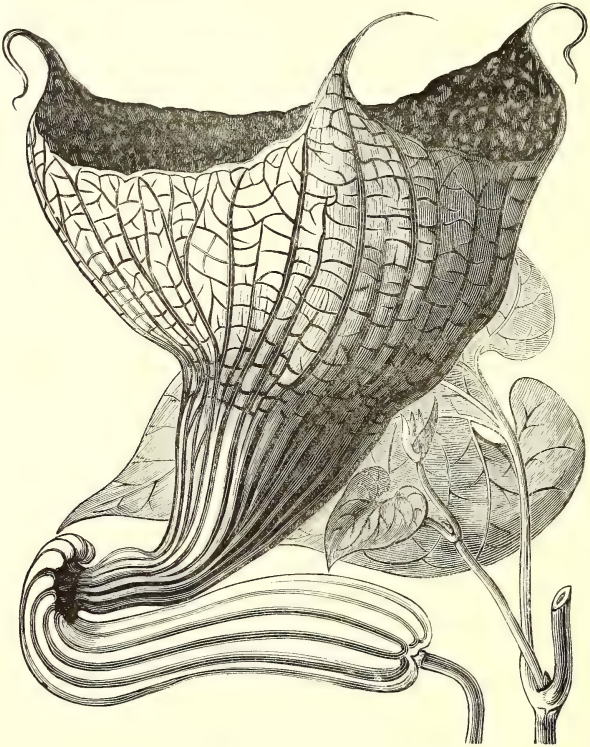

Fig. 131. Aristolochia Goldieana (one-third natural size).

Artocarpus.—The only species recommended for stove culture is A. laciniatus and its reddish-purple leaved variety A. l. metallica, from Polynesia. It is propagated by inserting cuttings of ripened wood in sand, under a hand-light in brisk, sweet bottom heat. A loamy soil suits them and the plants should be assigned a shady, moist position. Prune into shape in February and pot a fortnight or three weeks later. An ordinary stove temperature is all they need.

ASPARAGUS.

The introduction of the South African species of "Asparagus Fern" has led to the popularisation of Asparagus for decorative purposes. Cut sprays are both elegant and more durable than Maiden-hair fern (Adiantum cuneatum). As a consequence immense numbers of plants are grown both for home use and for supplying the market with trails and sprays. A. plumosus nanus, South Africa, is a most valuable species. In the young state the plants produce dwarf, tufted, gracefully arching stems, hence a mistake was made in naming it A. plumosus "nanus," and it is still wrongly catalogued as dwarf and distinct. In reality, the plants under good cultivation soon lose all appearances of having once been dwarf, the young growths rapidly attaining a length of 6 feet or more, and would be more correctly described as climbing. A. scandens, South Africa, is a climber from the first and is elegant and durable in a cut state, but not so effective as A. plumosus. Other species catalogued as stove plants are A. p. deflexus, elegant in baskets; A. retrofractus, and A. tenuissimus.

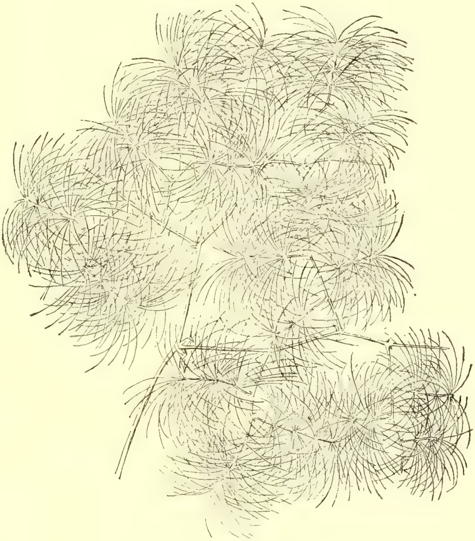

Fig. 132. Asparagus retrofractus.

One species, A. p. scandens, can be propagated by cuttings formed of the tops of young growths, inserted in sandy soil, plunged in gentle heat, and covered with glass; they are not slow in rooting, and the plants soon attain to a serviceable size. All the species are increased by dividing the roots in March, each crown or division having roots attached, and placed singly in pots just large enough to hold them. Still more plants are raised from seeds, some home saved, but the greater portion imported. Sow not later than March, thinly in pans, in light, sandy soil, pressing the seeds in and covering with fine soil. Germination will be the more sure if the pans are plunged or set on a mild hot bed, covered with glass and shaded. The seedlings may be six weeks or more before they appear, and if only a few seeds germinate at first, many more may do so later if the soil be kept uniformly moist. When the seedlings are large enough to move, lift them out with the point of a label without breaking the roots and place them singly in small pots.

The plants thrive best in a moist and somewhat shady position. Exposing them to dry heat or strong sunshine causes the leaves to turn yellow and drop. Transfer the plants to larger pots before the roots become matted together. If it is desirable that strong growth be made employ a somewhat rich compost or a mixture of three parts fibrous loam to one each of leaf soil and decayed manure, with sand, but if dwarf plants are preferred, use a poorer mixture, adding broken crocks freely.

Where unlimited supplies of sprays for cutting are required, the plan of growing the plants in borders or small brick pits should be adopted. A. plumosus is the best for the purpose, and the strong growths which healthy plants are constantly pushing up from the crowns can be either lightly suspended to the roof trellis or supported with stakes and raffia. If supplied with abundance of water and liquid manure at the roots, accompanied by gentle heat and a moist atmosphere, there will be no cessation of growth.

Strong heat is not recommended for these species of Asparagus; they may be successfully cultivated in a warm greenhouse. The most luxuriant growth of A. p. nanus we have seen, is against the back wall, 10 feet high, of a long lean-to house, facing north; winter temperature about 50°. A cartload of deep green sprays could be cut at one time without being seriously missed. The insect pests that injuriously affect the plants are green and black fly (aphides) and mealy bug. Nicotine fumes will keep the plants free of the first-named, and timely hand-cleaning will prevent the spread of mealy bug.

BEGONIA.

Tuberous Begonias have already been treated upon in the chapter devoted to Florists' Flowers (Vol. I.), but we have yet to discuss the merits of, and describe the treatment required by, the fibrous rooted or shrubby species, as well as the Rex group and others which are cultivated for the attractiveness of their leaves. Many and beautiful are the species, hybrids and varieties, now available for winter flowering more especially. Some few there are which will flower freely in warm greenhouses and conservatories during the summer and early autumn months; these, if transferred to warmer winter quarters, continue ornamental for many weeks longer There is now no sharp dividing line between the sections, as, thanks to the perseverance of various hybridisers, many of the bright colours as well as the floriferousness of summer flowering species have been transferred to the more perpetual or winter flowering kinds, while the beautiful foliage of the sanguinea type is now accompanied by a profusion of bright rose and other coloured flowers of which we have a good instance in the variety Gloire de Sceaux. The improvements in the Rex group are also most marked, the newer varieties being less coarse in appearance, and more brilliant in colouration — as, for example, in Princess Charles of Denmark.

The cultural requirements of Begonias are of the simplest description. The semperflorens group, or what may be termed the herbaceous kinds, may be increased by cuttings or the division of old plants; but seedlings come true to character, and plants so raised give the best results. Unless wanted for summer flowering, April is soon enough for sowing. Let this be done thinly on the surface of well-prepared, previously moistened, pans of sandy soil; place in moist heat, cover with glass and shade heavily till the seedlings appear. Gradually inure these to the light, but do not expose them to the sun and when large enough to handle, prick them into pans or boxes filled with a mixture of loam, leaf soil and sand. Gentle heat is still good for the plants, but when they are moved singly into 3-inch pots a warm close frame is suitable for their reception. Top to make them branch, and soon after shift the stronger of them into 6-inch pots and the rest into the 5-inch size. No more topping is needed, as the plants will branch freely, and if arranged on light dry shelves in September, and a rather warm atmosphere is maintained, they will flower continuously all the winter in a temperature of 50° to 60°.

The semi-shrubby section, which includes the old B. Knowsleyana, B. insignis, and B. nitida, together with the hybrids Gloire de Lorraine (Fig. 133) (very charming and must not be over watered), Mrs. Heal and other beautiful forms, are propagated by cuttings formed of young shoots. To obtain these, give the plants a short rest after flowering, and then cut them back rather severely, when, if they are introduced into a moister atmosphere, and watered at the roots, young shoots will soon form. Take these off, insert in pots of light sandy soil, in a temperature of 70°. They must not be kept very close or damp, as this may lead to decay at the points, and probable loss of the cuttings. Very choice varieties may be left in the cutting pots till the tops are long enough to convert into more cuttings, while those more plentiful should be topped soon after they have commenced growing. When these topped plants begin pushing out side-shoots, place them singly in small pots, and in all other respects treat much

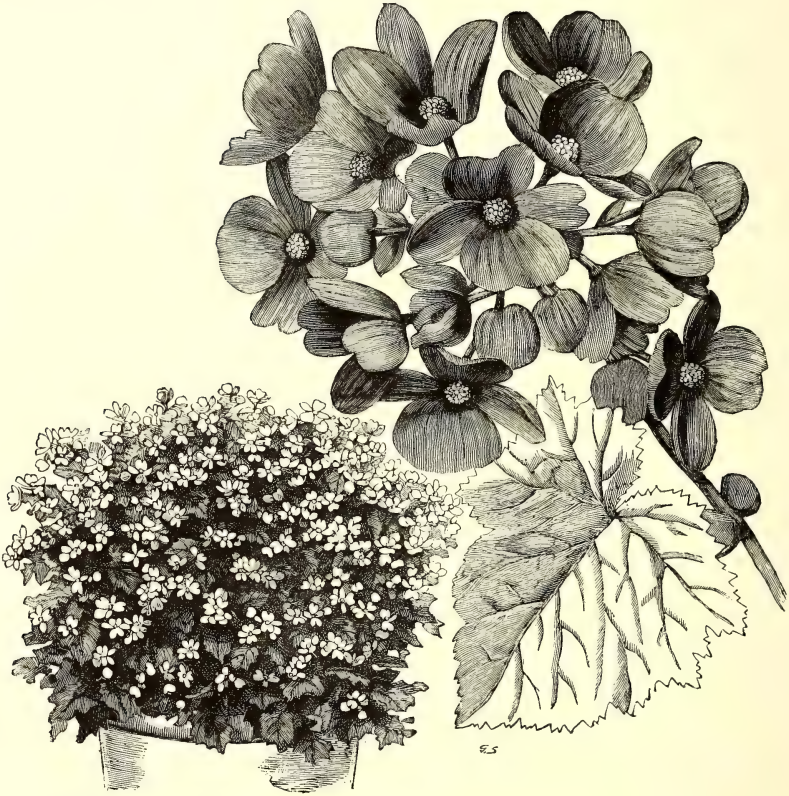

Fig. 133. Begonia Gloire de Lorraine (colour bright rosy pink).

as advised in the case of the semperflorens section. Gentle heat and a comparatively dry atmosphere suit them best during the winter.

Begonias with a fleshy root-stock, of which the old B. weltoniensis is a good example, may be increased by division or by cuttings of young shoots obtained from the root-stocks in March or April. A few species form annual stems, at the base of which a cluster of bulbils are produced. The best of these kinds is B. socotrana. The summer is the resting period for these, and if the bulbils are started into growth in heat early in September, plants strong enough to flower freely during the winter should result.

Varieties of the Rex group are, as a rule, stemless, and can be increased by division just when they are commencing to form new leaves, but the better way to propagate them is by leaf cuttings. Select sound, fully-matured leaves, and prepare them by cutting through the thicker parts of the ribs to be found on the underside (see Fig. 134 *a*), doing this at six or seven places. Fill shallow pans with sandy soil, surfacing this with silver sand. Insert the stalk so as to bring the leaf close down to the sand, and either place small pieces of potsherds, or insert pegs close to each point where a cut has been made, as shown at *b*. Place the pan in a temperature of 65° to 75°, shade the leaves from the sun, and keep the soil moist. If these instructions are carefully observed, plantlets will form where the cuts were made and also at the point, where the leaf joins the stem. When these, one of which is represented at *c*, Fig. 134, have become well rooted, they should be lifted out of the soil and placed singly in small pots, shifting them into larger sizes as they need more root room. The plants succeed in a warm greenhouse, and are effectively employed with ferns in furnishing walls of ferneries and conservatories.

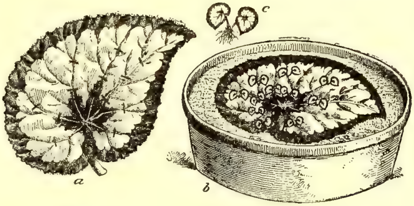

Fig. 134. Raising Begonias from Leaves.

References: *a*, leaf with ribs marked for cutting; *b*, resulting plantlets; *c*, young plants separated.

BEGONIA SPECIES AND VARIETIES.

As already pointed out there are a large number of Begonia species and hybrids in cultivation, while the number of varieties is also greatly on the increase. Brief notes on some of the more popular representatives are appended.

Flowering Species.

B. coccinea.—Brazil. Shrubby growth, flowers in pendulous racemes, red; summer.

,, Dregei.—Rootstock fleshy, stems annual, flowers in axillary racemes, white; summer.

,, fuchsioides.—New Grenada. Stems tall, sub-herbaceous, flowers in branching pendulous panicles, rich deep scarlet; summer. B. f. miniata is smaller than the type; flowers cinnabar red.

,, heracleifolia.—Mexico. Rootstock thick and fleshy, leaves ornamental, flower-stalks long, erect, hairy, many-flowered, rose coloured; spring. Longipila, nigricans, and punctata are varieties of B. heracleifolia.

,, incarnata (syn. B. insignis).—Mexico. Stems erect, height 2 feet, flowers in terminal, nodding peduncles, rose coloured; winter. B. i. metallica is a desirable form with bronzy purple, metallic leaves.

,, Lynchiana.—Mexico. Tall erect stems, and large leaves, flowers freely produced, in large axillary cymes, reddish crimson; winter.

B. manicata.—Mexico. Stems stout and large, fleshy leaves, flowers in branching cymes, pink; winter.

,, nitida.—Jamaica. Stems 4 feet to 5 feet high, leaves large, flowers in large terminal and axillary panicles, deep rose; winter and spring

,, sanguinea.—Brazil. Stems tall and woody, leaves large, upper surface green, underside deep red, flowers in branching cymes, white; spring.

,, semperflorens.—Brazil. Stem fleshy, leaves medium sized, flowers large, on axillary stalks, white; autumn, winter, and spring. Frau Maria Brandt, of compact growth, flowers rose coloured; rosea, rose coloured, and carminea, are good varieties of B. semperflorens.

,, socotrana.—Socotra. Stem annual, stout, and succulent, leaves large, flowers in terminal, few flowered, cymes; winter.

,, suaveolens.—Central Africa. Stem tall and branching, leaves large and glabrous, flowers in large axillary panicles, white, sweet scented. A good companion for B. nitida.

Flowering Hybrids.

B. Adonis.—Robust, erect habit, bold foliage, flowers large, numerous, bright rose-carmine; winter. New and good.

,, Arthur Malet.—Leaves bright rose with a silvery gloss, flowers rose pink.

,, carminata.—Stems erect, leaves medium sized, flowers in drooping axillary cymes, carmine-pink; summer, good for suspending.

,, Digswelliana.—Fleshy rootstock, stems short, semi-decumbent, leaves large, green, with red margin, flowers small on long, erect scapes, pale pink; winter.

,, Ensign.—Good habit. Flowers large, on erect peduncles, bright rose-pink; winter, good.

,, erecta multiflora.—Of erect growth. Flowers bright reddish pink; winter.

,, Gloire de Lorraine.—Of a neat habit of growth, very floriferous. Flowers bright, rose-pink; winter. A valuable acquisition. (See Fig. 133).

,, Gloire de Sceaux.—Tall growing. Leaves large, with bronzy metallic lustre, crimson underneath, flowers freely produced, bright rose-pink; winter. Handsome.

B. incomparablis.—Large handsome leaves, flowers large on extra long scapes, scarlet; winter.

,, John Heal.—Good habit. Flowers large, persistent, in loose racemes, crimson-scarlet; autumn and winter. Valuable.

,, Mrs. Heal.—Stems short, leaves medium sized, flowers large, freely produced and borne on long peduncles, carmine toned with scarlet; autumn and winter. A valuable acquisition.

,, Myra.—Habit pleasing. Flowers large on arching peduncles, bright rose-carmine. Another valuable addition to the winter flowering section.

,, weltoniensis. — A well-known summer and autumn flowering variety, compact in growth, with handsome leaves, flowers freely produced, light pink.

,, Winter Gem.—Dwarf habit, neat foliage. Flowers borne well above the leaves, rich scarlet-crimson; winter. One of the best.

BEGONIAS WITH ORNAMENTAL FOLIAGE.

These, if hybrids are excepted (of which B. decora, Fig. 136, is a beautiful type), belong principally to the Rex group. B. Rex, Assam, is stemless, forming fleshy rhizomes. The leaf stalks are round, red, and hairy. Leaves 8 to 12 inches long and 6 to 8 inches wide. Margins toothed, surface dark olive green, with a metallic lustre, a broad silvery zone running all round. From this grand species have originated numerous more or less distinct and beautiful varieties. The essentials for cultivation are healthy root action in generous soil, such as turfy loam with a fourth part of leaf soil and sufficient crushed charcoal and sand to secure porosity; copious supplies of water in the summer and comparative dryness in winter; a cool stove temperature and a shaded position. They luxuriate when planted on the shaded side of rockeries, in warm structures, and form a magnificient undergrowth for palms and tree ferns. The leaves of some, if not most, varieties are injured by hot sun and frequent syringing.

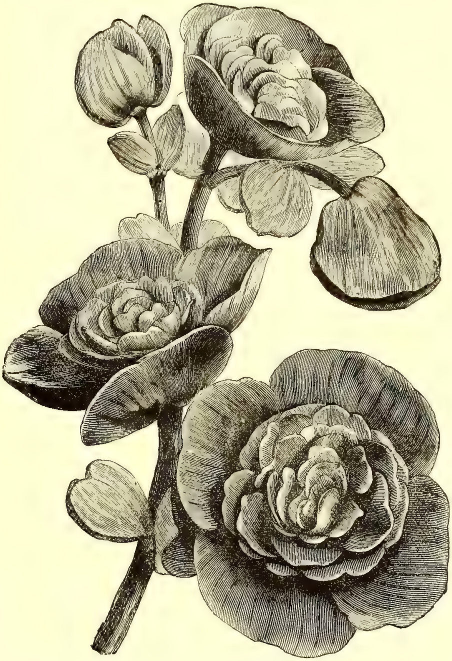
Fig. 135. BEGONIA ENSIGN. (Veitch.)

SELECTION OF ORNAMENTAL FOLIAGED BEGONIAS.

The following selection of varieties has been made from the collection of Messrs. H. Cannell & Sons, Swanley.

REX BEGONIAS.

ADRIAN SCHMIDT.—Silver, narrow flesh edge.

AMAZONE.—Mottled silver and green, edged deeper.

B. MCGREGOR.—Silver, narrow green edge.

CHAS. HOVEY.—Very dark green, slightly marbled white.

CHERUBIN.—Pea green mottled white.

COMTESSE DE LOUISE ERDODY.—Silver, green veins, broad lake margin.

ETOILE D'ARGENT.—Silver, dark base with deeper margin.

Rex Begonias (*continued*).

Frederic Schneider.—Green, mottled silver.
Henri de St. Didier.—Dark green base, silver, edged green.
Mme. Chate.—Dark green base, silver, edged green, hirsute.
Mme. de Guerle.—Silver ground, broad margin, spotted silver.
Otto Forster.—Very distinct olive green ground, blotched pea green, velvety.
President Carnot.—Large silver leaf, slightly mottled green.
Richard.—Bronzy green leaf, mottled white.
Des Fontaines.—Silvery green base, mottled margin bronzy green.
Duchess.—Silver and slightly edged deeper.
Gaetan O'Gorman.—Very distinct, silver, green base, with reddish margin.
Mrs. S. Low.—Silver, with green veins.

BERTOLONIA.—To this family of dwarf-growing stove plants, gravesias are so nearly allied that for all practical purposes they may safely be grouped together. All are cultivated for the beauty of their leaves, and when seen in good condition are chastely attractive. Some of the most popular species are B. guttata (syn. gravesia guttata), with its varieties, margaritacea, albo-punctata, roseo-punctata, and g. superba; B. maculata, B. marmorata, and B. pubescens. All are propagated by cuttings inserted in light, sandy soil, in well-drained pots or pans, covering these with bell-glasses, in a temperature of 75°. The spring is the best time to do this. The plants thrive in equal parts of peat, leaf soil, and sand, and must be kept in a warm, close, and moist atmosphere. They are usually seen at their best in ornamental pans, covered with a bell-glass, or in a miniature frame on a bed in a hot-house; exposure to the sun in a dry atmosphere is fatal to the plants.

BIGNONIA.—Included in this family of shrubby climbing plants are a few species that require to be grown in either a warm greenhouse or an ordinary stove. They are cultivated principally for their flowers, which are large, trumpet-shaped, and produced, as a rule, in axillary and terminal panicles. The three species selected are B. argyreo-violascens, South America, leaves white veined, and in a young state violet; B. speciosa, Uruguay, growth shrubby, flowers pink, stained with purple, May; B. venusta (Fig. 137), Brazil, flowers orange crimson, abundantly produced from August to December. Propagation is effected by cuttings of young wood, 3 inches long, inserted in April, in well-drained pots of sandy soil, and placed in a temperature of 65° to 70°. The young plants first established in small pots are either given liberal shifts into larger sizes, or planted in narrow borders—these suiting them better than pots. They succeed in a mixture of two parts fibrous loam, one part each of peat and leaf soil, with a little sand. Pot or plant firmly. Train the plants either near the glass, or assign them a sunny position, as only firm, well-ripened wood will flower satisfactorily. Supply abundance of water, varied with liquid manure, during the growing and flowering period, and only sufficient during the winter to prevent the wood shrivelling. In February prune the weakly growths rather severely, and the strong wood to the extent of removing two-thirds of its length. Re-pot such plants as need it soon after fresh growth has commenced, and add a little fresh soil to borders.

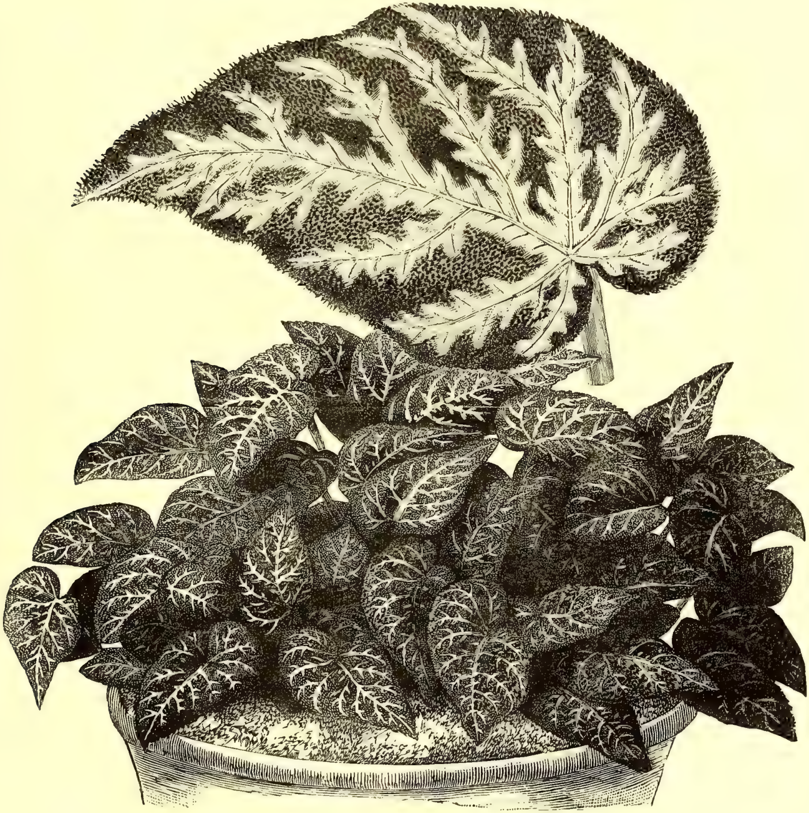

Fig. 136. Begonia decora.

BILLBERGIA.—This family of stove-flowering plants only calls for a brief reference, so few of them being cultivated in private gardens nowadays. Among the best of the species grown, are B. Moreliana, Brazil, flowers red and purplish-violet, bracts large and rosy red in colour, February; B. rhodocyanea (syn. Æchmea fasciata); R. thyrsioides, Brazil, flowers in dense spikes, June; B. vittata, Brazil, flowers indigo blue, with crimson calyces and bracts, March. Billbergias are nearly allied to Æchmea, succeeding well under the same treatment, for which see page 269.

BOUGAINVILLEA.

Although classed as stove plants, Bougainvilleas really succeed best, and flower the most abundantly, in a warm greenhouse or conservatory. It is not the small greenish white flowers so much as the bracts which enclose them that attract attention, these remaining fresh and bright in colour long after the flowers have withered. Only two species are in cultivation, one of them affording two varieties. The most popular for exhibition and other purposes is B. glabra. This is a native of Brazil, and produces its inflorescence in panicles in the summer. The flowers are greenish white, bracts rose-coloured. B. glabra, var. Sanderiana, differs from the type in the colour of the bracts, which is purplish-rose. This variety flowers freely in a small state, and profusely when the plants are large. B. glabra Cypheri is of the same shade of colour as Sanderiana, but the bracts are much larger, and the variety is therefore more valuable for exhibition. B. spectabilis (syn. B. speciosa), Brazil, is the other species alluded to. This, when properly treated, flowers grandly in the spring. The bracts are rose-coloured.

Bougainvilleas are not difficult to propagate. Cuttings may be formed of young shoots about 3 inches long, any time during the spring, and inserted in small pots of sandy loam, plunged in brisk bottom heat in a close frame, or covered with a bell-glass or hand-light. When well rooted, gradually inure the plants to the sun and air, a light position and an intermediate temperature best suiting them during the growing season. Top to make them branch, and soon afterwards shift into larger pots. Support the growths with a single stake and raffia. In the autumn apply less water and rest the plants in a warm greenhouse, giving only sufficient water to prevent the wood shrivelling. In February, prune rather severely, that is if strong growth rather than flowering shoots are desired, and place the plants in more heat, accompanied by a moist atmosphere. On their producing fresh shoots turn the plants out of the pots, partially clear the roots of old soil, and return to the same sized pots as they were in previously. At this and all other pottings the compost employed should consist of two-thirds good fibrous loam, broken up roughly for the larger specimens, and one-third peat, insuring porosity by the addition of sharp sand and a little charred soil. Pot firmly. Young plants that are desired to flower in a small state ought to be exposed to the full light and neither topped nor re-potted. Sander's variety of B. glabra is excellent for the purpose indicated.

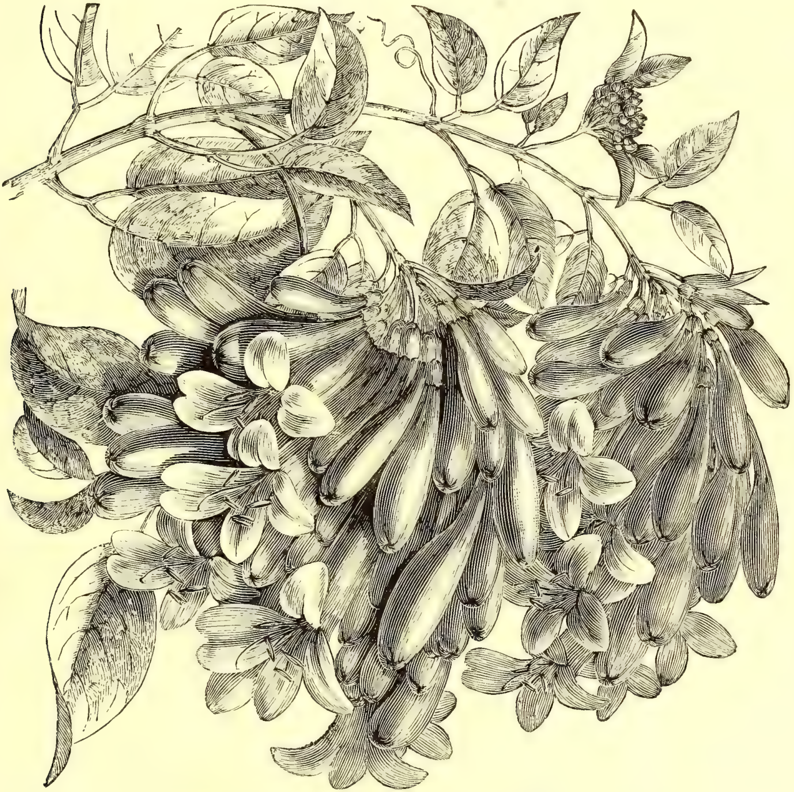

Fig. 137. Bignonia venusta. (See page 294.)

If trained specimens are wanted, the plants should not be exposed to much sun, and ought to receive a shift into larger pots so soon as they have well filled the new soil with roots. Keep them carefully supplied with water at the roots, and syringe the growths daily. Thus treated, long, strong shoots, in sufficient number to thinly cover a medium-sized balloon-shaped trellis, should result. Rest and treat as before during the winter. If they are to flower the following summer, only very lightly top the long growths, removing the unripe portions, but if larger specimens, such as are seen at the leading exhibitions, are desired, then the growths should be pruned severely again with a view to doubling their number and having them extra strong. Start all the pruned plants in gentle heat, and treat them at the roots as previously advised; partially reducing the old ball of soil and roots every spring renders it possible to flower large plants in much the same sized pots for many years in succession. The long, fully ripened growths may be retained permanently. Every strong or moderately strong branchlet from these will flower profusely, and if these are shortened to near where they started when pruned, in the spring, other strong flowering growths will result. Raise the plants well up to the light in a warm greenhouse, and do not train too tightly, especially when the branchlets are young. When the soil is well occupied with roots, abundance of water and weak liquid manure must be applied; but at the same time it should be remembered that either insufficient water, or an excess of liquid manure, is liable to cause a serious loss of leaves and thus disfigure the plant for the rest of the season.

Bougainvilleas give the least trouble, and are remarkably effective when established in warm conservatory or greenhouse borders. Planted in ordinary stoves they are disposed to grow too luxuriantly, and the colour of the bracts is not so good as when the plants are grown in an intermediate temperature. The site for them should be well drained, and the compost no richer than that recommended for pot culture. It is only by planting B. spectabilis in conservatory borders that it can be had at its best, but B. glabra and its varieties are more to be depended upon. The growths may be gradually extended from pillars or walls to the roofs of houses, and the ends of warm greenhouses can be beautifully draped with festoons of glowing sprays. The strong growths formed during the summer will ripen more thoroughly if the plants are kept somewhat dry at the roots, as they ought to be, during the winter, and should only have the soft ends removed at the February pruning. Once a trellis of any kind is thinly covered with strong growths it will only be necessary to keep them properly fastened, and to spur back all lateral growths much as grape vines are treated, with this material difference, that B. spectabilis must not be pruned till after it has flowered in the spring, while B. glabra and varieties should be severely pruned in February, these flowering during the summer, and frequently lasting in good condition till October Bougainvilleas are liable to attacks from most kinds of insect pests, red spider, and green fly, if not kept down by syringing and fumigating, causing the leaves to drop prematurely.

BROWNEA.—Apart from botanical collections, neither Brownea nor its near ally Amherstia nobilis is met with in British plant stores. B. grandiceps, Caraccas, is the only species catalogued by some of the leading nurserymen. It is an evergreen shrub, and if properly treated produces dense spikes of red, pea-shaped flowers in July. In its native home the tree attains a great height, and is very beautiful when in bloom. Cuttings of ripened wood, inserted in pots of sand and plunged in moist heat, will emit roots, and the plants should be potted in a mixture of loam, peat, and sand. They require to be grown in a high temperature with a moist atmosphere, and must be watered very carefully during the winter, an excess then being highly injurious.

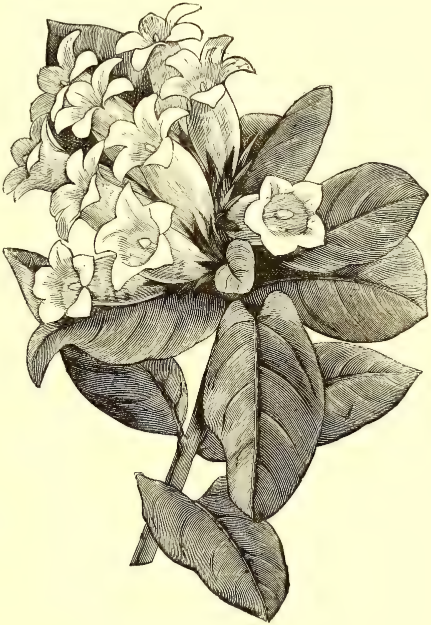

Fig. 138. Burchellia capensis.

BURBIDGEIA.—B. nitida, N. W. Borneo, is an herbaceous stove-flowering plant, allied to, and requiring much the same treatment as, Hedychium, page 192, Vol. II. Height 2 to 4 feet. Flowers orange scarlet, summer. It is increased by division of the roots in April, and succeeds well in a mixture of equal parts loam, peat, and leaf soil, allowing ample root room. Supply water freely during the growing season, but somewhat sparingly when the plants are at rest.

BURCHELLIA.—A single species, B. capensis, Cape of Good Hope, represents this family. It is an evergreen shrub, which attains a height of 3 to 5 feet. Flowers scarlet, produced on the tops of the branches; March. It is propagated by cuttings of firm young shoots, inserted in sandy peat, and covered with glass in a temperature of 75°. Pot in a mixture of fibrous loam, peat, and sand. Apply water in abundance from April till September, afterwards more sparingly, though not to the extent of keeping the soil in a dust-dry state. Ordinary stove treatment.

CALADIUM.

For the adornment of plant stoves and well-heated conservatories, Caladiums have long been highly popular, but attractive as were the old varieties, they are completely eclipsed by the many and beautiful forms introduced of late years. Both British and Continental growers have been successful in raising large numbers remarkable for the markings and colouring of their leaves, dwarf as well as tall-growing varieties being represented. A few species are classed as evergreen, but these are not valued, attention being diverted to the cultivation of the herbaceous or tuberous-rooted section, most of which are hybrids raised principally from C. bicolor—a species introduced from Brazil in 1773.

Propagation is effected by division of the tubers in February or March. When top and root-growth commence, and before leaves are showing, large tubers may be cut into as many pieces as there are well separated crowns, taking care not to damage the roots. After coating the wounds with dry sand, place each division in a pot large enough to hold it properly, employing a mixture of equal parts loam, peat, and leaf soil, with a liberal addition of sharp sand. Arrange them on a moist stage or bed over hot-water pipes, and syringe twice daily, not watering till the third or fourth day. The roots will soon take possession of the soil, and before they become matted together transfer the plants to clean, well-drained pots, two sizes larger than they were in before, using a slightly enriched compost. When growing strongly they should have abundance of water and liquid manure, and the plants must not be crowded together, as this weakens and draws out their stems unduly. They require shade from bright sun. For house decoration and grouping for effect, plants with only one or two crowns are preferable to heavier or more dense specimens of the strong-growing varieties; but this remark does not apply to the smaller-leaved forms, notably the chaste, silvery C. argyrites and rich Chelsea Gem (Fig. 139).

In the autumn the plants, generally, lose their freshness, and when no longer ornamental, water should be gradually withheld from them, and the leaves will die down.

A critical period is then reached. If stored under stages far away from hot-water pipes, and where there is much drip from various plants above, there is every likelihood of the tubers rotting, whether the pots are laid on their sides or not. Nor ought the tubers to be turned out of the pots and stored. As soon as the tops are dead, remove them, and lay the pots containing the tubers on their sides in a warm and dry position, somewhere near the hot-water pipes, under the side benches rather than the central stage of the house. There ought to be enough moisture left in the soil to keep the tubers plump, and top growth should be looked for in February.

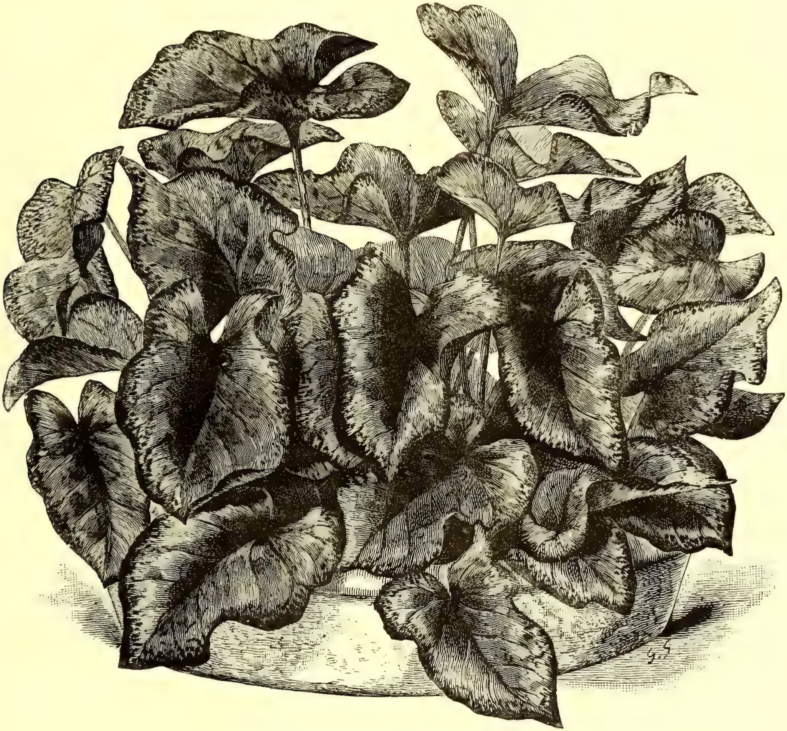

Fig. 139. Caladium Chelsea Gem.

It is not good to leave the tubers in the old soil long after they have recommenced growth, nor is it advisable to place them direct into large masses of fresh compost.

First arrange them thinly in boxes of soil, burying the tubers an inch below the surface, and when they have formed numerous young roots, all may be placed in pots in which they are to remain throughout the season, arranging them according to their vigour, several tubers in a pot, if large specimens are desired. For the larger pots a rough compost should be employed, and a little well-decayed manure may be added to the soil for old tubers with advantage. Drain the pots thoroughly, and make the soil moderately firm. Care must be taken not to overwater during the first month, but when the soil is fully occupied by roots there should be no stint of either water or liquid manure. Caladiums revel in moist heat, and though some shade is needed, it should only be afforded during the hottest part of the day. Remove all flower stems as often as they are seen. If the plants are required for house or conservatory decoration, they ought to be prepared for the change by gradually inuring them to lower temperatures, and they must be returned to the stove directly they lose their freshness. Neglect this precaution, and many of the tubers will probably fail to keep sound. The following beautiful varieties are chosen from the Chelsea collection of Messrs. Veitch & Sons.

Selection of Caladiums.

Twelve Dwarf Varieties.

Lady Stafford Northcote, rich deep-red, shaded crimson.
Mrs. McLeod, bright salmony-red.
Exquisite, bright red-carmine, light-green margin.
Baroness Schroeder, red with crimson veins.
Her Majesty, apple-green, silvery-white veins.
Lady Mosley, rose-carmine, bright carmine veins.
Chelsea Gem, bright crimson-carmine.
Comte de Germiny, red mottled with white.
Duke of York, rose-carmine.
L. H. Moore, crimson-scarlet, self coloured.
La Lorraine, fiery-red, pale-green margin.
Le Nain Rouge, copper-red, round leaves.

Twelve Tall or Medium Growers.

Marquis of Camden, sanguineous-red, and dark-green.
Silver Cloud, silvery-white, green and carmine spots.
Sir Julian Goldsmid, glowing red veins and reticulations.
Baron A. de Rothschild, dark-crimson, rose spots.
Candidum, white ground, green veins.
Gaspard Crazer, crimson centre, some green on the margin.
Louis A. Van Houtte, very dark red.
Mdme. E. Pynaert, deep carmine-red, self coloured.
Mdme. John Box, pale-rose ground, greenish-white border.
Princess of Teck, orange-red centre, yellow-green border.
Sir Henry Irving, creamy-white centre, mottled-green border.
Mrs. Harry Veitch, dark-red.

CAMPYLOBOTRYS (Hoffmannia).—Although introduced from tropical countries, and usually classed as stove-plants, all the species worthy of general cultivation succeed remarkably well under warm greenhouse treatment, that is to say, in a temperature intermediate between that of a stove and greenhouse. C. Ghiesbreghtiana, South America, attains a height of 3 feet, and has large broad leaves, while the flowers are produced in axillary cymes : colour yellow, spotted red on the disk. There is a variegated form of this species (C. G. variegata), having leaves blotched with creamy white. C. refulgens, South America, height 1 to 2 feet, flowers pale red in solitary cymes, and C. regalis, Mexico, height 1 foot, flowers inconspicuous, leaves glabrous, shining dark green on the upper surface, reddish purple underneath, are the other species catalogued. They are increased by cuttings 2 to 3 inches long, inserted in sandy soil, under a bell-glass, or in a temperature of 65° to 75°, at any time between February and June. Top to make the young plants branch, and when shifting them from small pots into larger sizes employ a mixture of two parts peat to one of leaf soil, adding sand and charcoal freely. Pot firmly. During the summer the plants may be grown in pits, frames, or sheltered sunny positions in the open air. Syringe daily.

CARAGUATA.—A small genus of Bromeliads, of which a few are very beautiful; their characteristic features are well represented in C. lingulatæ cardinalis (Fig. 140). It is a native of Columbia, and when well-grown cannot fail to arrest notice; the plant is of sturdy habit, flowering when a foot high, or a little more; the leaves are about 18 inches long, by 1½ inches in width, and deep green. The flower spike rises from the centre of the plant, and produces dense bracts of a bright scarlet or cardinal colour; these, and not the white flowers, imparting to the plant its strikingly ornamental appearance. C. musaica has beautifully marked leaves, white flowers, and vermilion bracts, and C. Zahni yellow flowers and scarlet bracts. The plants are increased by offsets, in brisk heat, and generally require the same cultural treatment as their allies, Æchmeas (see page 269).

CENTROPOGON.—Of this small family only C. Lucyanus is to be found in many plant stoves. It is a garden hybrid raised at Marseilles by M. Desponds, as the result of crossing C. fastuosus and Siphocampylus betulæfolius. There are few plants more easy of culture, and moderately strong growths flower profusely during the winter. The flowers are tubular in form, colour rosy carmine, and are produced by short lateral spurs. Cuttings of young shoots about 3 inches long, taken preferably with a heel, inserted in sandy soil, and placed in a close frame with a temperature of 60° to 70°, produce roots freely. Top the young plants, and soon afterwards place them singly in 2½-inch pots, keeping them somewhat close and shaded till they have formed fresh roots. Before the soil becomes crowded with roots transfer the plants to 6-inch pots, in which size they may be flowered. Afford ample drainage, and use a compost of equal parts fibrous loam, peat, and leaf soil, with some sharp sand. Pot rather firmly. Keep the plants in a stove temperature till late in June, when they may be placed in a sunny pit or frame, where they must be kept well supplied with water. If the plants are to be flowered in hanging baskets, for which purpose they are admirably adapted, stand them on inverted flower-pots, and allow the growths to assume their natural pendulous habit. Otherwise support with stakes. Remove the plants to a stove or warm greenhouse about the middle of September, and be careful not to overwater them. After flowering give them a short rest, and then cut the stems down to the root-stock. When they commence pushing fresh shoots, shake the roots nearly free of soil, trim lightly,

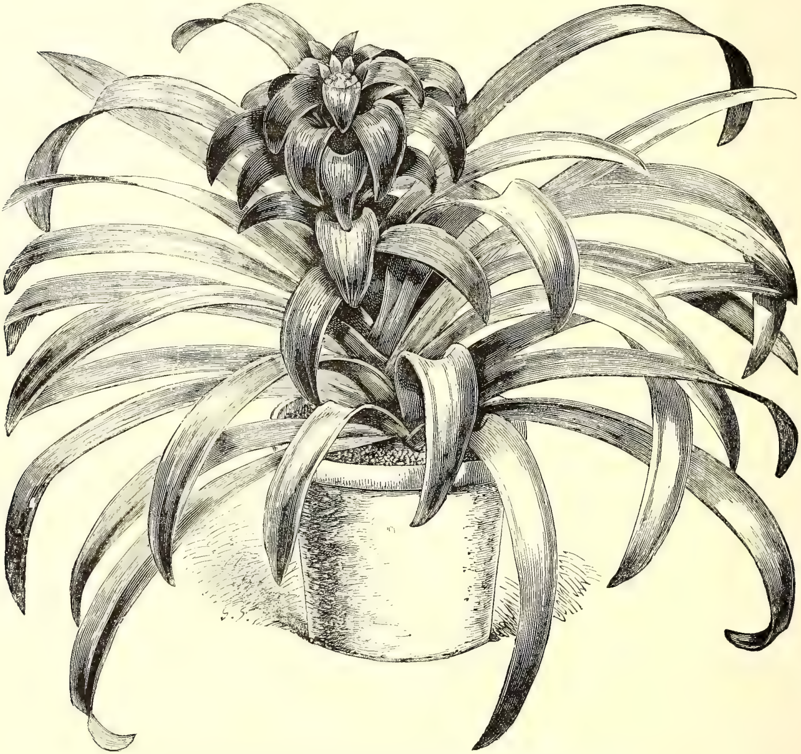

Fig. 140. Caraguata lingulata cardinalis. (See preceding page.)

and re-pot in the same size as before. In due course shift into 9-inch pots, and if treated subsequently as advised in the case of young plants, comparatively large specimens will be available for flowering during the winter.

CIENKOWSKIA.—A single species, C. Kirki, represents this genus. It is a native of Zanzibar, and may be briefly described as a stove herbaceous perennial, which produces pale, rosy-purple, sweetly-scented flowers, borne on erect scapes 3 to 4 inches long, from July to September. Propagate by division of the roots in February. Compost suitable, equal parts of loam and peat, with a little sharp sand. Supply water freely during the summer, gradually withholding it in the autumn, and rest the plants during the winter.

CISSUS. — So called from the resemblance to *kissos*, Ivy, in habit; but in beauty of foliage, no ivy can be said to equal C. discolor, when this species is seen in its best condition. It is a native of Java, and produces insignificant greenish-yellow flowers; but the long, broad-pointed leaves are very handsome, the upper surface bright velvety-green, spotted or mottled with white, and the under side deep reddish purple. C. porphyrophyllus, Borneo, is coarser and therefore not nearly so beautiful as C. discolor. Propagation is effected by cuttings of young shoots about 2 inches long, with a small heel of old growth attached, and inserted in April round the sides of well-drained pots filled with sandy peat, and placed in a close frame, with bottom and top heat of 70° to 80°. When rooted carefully transfer the young plants singly to small pots, still keeping them in brisk heat, and shaded from strong sun. Move them carefully into larger pots as the plants require more root room, and train the growths round light trellisses. They succeed and colour well in shaded positions.

The most luxuriant plants with the grandest foliage are grown in narrow, raised borders, and trained up pillars and over roof-girders. The compost suitable for pots or borders consists of two parts fibrous peat, one part light fibrous loam, and one part leaf soil, with charcoal and sand added to insure porosity after the fibre has decayed. For the smaller pots the soil should be made rather fine, but for larger pots and borders the peat and loam ought to be broken up roughly. When the soil is well occupied with roots, abundance of water and weak liquid manure should be applied. In the autumn the foliage loses its beautiful colouring, and, if water is gradually withheld, many of the leaves will fall. After the plants have been rested in a stove temperature, they should be closely pruned in February and started into active growth. When fresh shoots push, the plants ought to have their roots nearly cleared of old soil and be re-potted. If a shift has to be given later on, do this very carefully, as the balls of soil and roots break up easily. Mealy bug is very liable to overrun and disfigure the foliage. Strong insecticides, notably petroleum in any form, must not be used in the summer or the leaves will be spoilt. Give the plants, when at rest, a thorough cleaning, and keep a close look out for any insects that escape, promptly destroying them, and a serious infestation may be prevented.

CLERODENDRON.

There are few more popular stove-plants than Clerodendrons. The climbing species and hybrids are wonderfully effective as pillar and roof plants, and the same kinds trained and flowered on large balloon trellisses are valuable for exhibition purposes. The shrubby section are less met with than formerly, but they are well worthy of good culture. C. Thompsonæ, also known as C. Balfourianum, introduced from Old Calabar, is the most popular climbing species. It is of moderately strong growth, and produces large dense panicles of bright crimson flowers, well set off by pure white calyces of a most durable character. C. speciosum, a hybrid, differs from the preceding in having scarlet flowers and reddish calyces. Another desirable climbing species is C. splendens, Sierra Leone; flowers scarlet in terminal panicles, and of this C. s. speciosissimum is a bright scarlet form. C. fallax, Java, is the best-known shrubby species. It is of erect growth, has large broad leaves, on long foot-stalks, and produces large, terminal, many-flowered panicles of bright scarlet flowers in August and September. C. infortunatum is taller growing, and produces large panicles of vivid scarlet flowers.

The climbing species are not easy to propagate. Cuttings are usually made of short lengths of ripened wood, saved when the plants are pruned, and inserted in sandy loam, covering with a bell-glass in a temperature of 70° to 75°. If they are rooted early enough in the summer to form young growth, place them singly in small pots, and arrange in a light position. More often no growth will be made before the time for resting the plants has arrived. Winter them on a shelf in a warm greenhouse. In March, or early in April, top growth will commence, and the young plants may be carefully separated and placed singly in small pots. They will make the best progress in brisk, moist heat, and should be shifted into larger pots before the roots become matted together. Pot, or if the Clerodendrons are to be trained up pillars and over archways, plant in a mixture of two parts each of brown fibrous loam and fibrous peat, one part leaf soil, a little fine decayed manure, with some charcoal and sharp sand. For

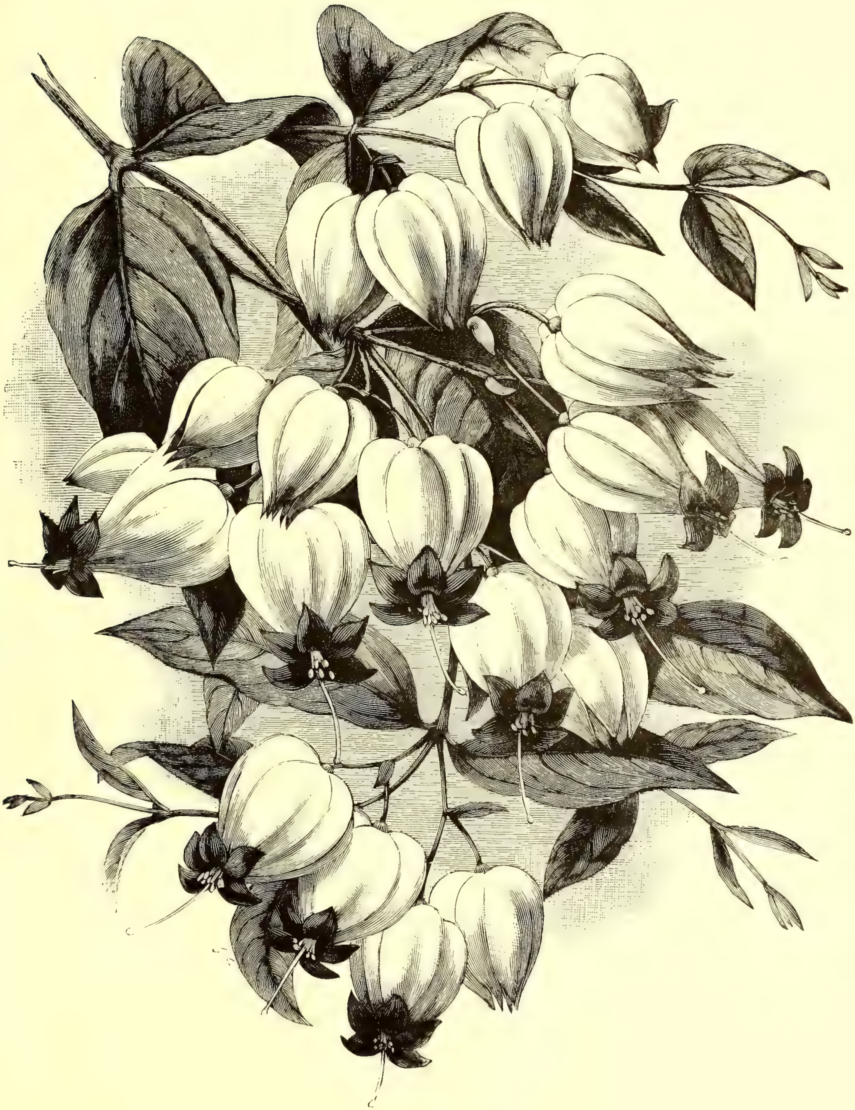

Fig. 141. Clerodendron Thompsonæ

the borders and larger pots the compost should be much coarser than can be employed in small pots. Pot somewhat firmly. Long and strong growths are most to be desired, and these should be lightly trained. During the autumn and winter rest the plants in a temperature of 55° to 60°, giving only sufficient water to keep the wood plump. Subjecting either large or small plants to a lower temperature than that given with a view to retarding the flowering period, is a risky proceeding which has ended in the loss of large numbers.

For ordinary purposes start the plants into growth in January or February, though this may be deferred till March—especially in the case of plants that made their growth late in the previous season. It is the strong, well-ripened young wood that flowers, and only the weakly ends should be cut off at the winter pruning; but the flowering shoots will be produced with greater regularity if the reserved wood is arched or trained round a trellis. After this light pruning and training introduce the plants into a moist heat of 65° to 70°, and when young shoots have pushed, turn the plants out of the pots, shake the roots nearly clear of soil, lightly shorten them, and return to well-drained pots large enough to hold them without unduly cramping the roots. After this the plant may be formally trained if needed. They must be carefully watered at first, but as the soil becomes well filled with roots, water should be given more freely, with weak liquid manure by way of assistance to the thirsty roots. When the plants are in flower they will remain attractive for several weeks, in a rather dry, intermediate temperature. Directly the flowering is over, give less water for a few days, and then cut them back severely, and return the plants to moist, brisk heat, where they will rapidly develop long and strong growths for flowering the following summer. In the autumn raise the plants well up to the glass for the sunshine and heat to assist in the proper maturation of the wood, and duly rest them in a cool stove or warm greenhouse.

Shrubby Clerodendrons may be propagated by cuttings formed of short lengths of wood saved at pruning-time, inserted in sandy soil, and plunged in a bottom heat of 70° to 75°. Few, if any, of these cuttings can be flowered the same season as they are rooted, and in any case better results attend the practice of raising plants from seed. Seedlings are the more robust, form the best foliage, and produce the grander panicles of flower. If the plants are flowered in a light position and somewhat dry atmosphere they will seed freely, and there should not be any great delay in sowing. When it has to be purchased, new seed should be stipulated for, and sown in February or March. Press the seeds firmly into pans of sandy soil, and cover a quarter of an inch deep. Place in brisk, moist heat of 75° to 80° cover with a square of glass, and shade heavily till the seeds germinate. When the seedlings have formed a single rough leaf, place them singly in small pots, and keep them growing in brisk heat and a moist atmosphere. If either seedlings or plants raised from cuttings are arranged on a dry, hot shelf, and kept there long enough for the pots to become crowded with roots, the plants receive a severe check from which they never recover.

From the small pots there must be no undue delay in shifting into 5-inch or 6-inch sizes, and from these the stronger plants may be moved, before they are root-bound, into pots two sizes larger, employing a compost similar to that recommended for the climbing species. Avoid either arranging the plants in dry, hot positions, or crowding them among a variety of other plants. They should have a light position in an ordinary stove temperature, also shaded from strong sunshine, and be syringed frequently to keep down red spider. During the second summer each plant will produce a single grand panicle of bloom. From first to last they must be kept well supplied with water, and liquid manure will greatly assist in producing strong healthy growth.

After flowering, rest the plants, keeping them rather dry at the roots; cut them down in February, re-start into growth in moist heat, and, when fresh shoots are forming, reduce the old ball of soil and roots freely, re-potting into sizes large enough to hold them without unduly cramping the roots. A shift should be given before they become root-bound. In other respects treat similarly to young plants. It will be found, however, that young plants raised from cuttings or seed are the most effective and serviceable.

COCHLIOSTEMA.—Only a single species of this genus is in cultivation, C. Jacobianum, a handsome stove perennial from the Andes of Ecuador. It forms long, dark-green arching leaves, sheathed at the base, and in the autumn produces long cymes of sweetly-scented blue flowers from the axils of the leaves. It is raised from seed, which can be saved from the old plants. Sow this as soon as ripe, in sandy soil, and place on a hot-bed to germinate. From small pots gradually shift the plants into larger sizes, employing a compost of equal parts loam, peat, and leaf soil, with a sprinkling of sand. The pots must be well drained, and abundance of water supplied to the roots, together with frequent syringings of the foliage. The plants will thrive and flower freely in a shady position in an ordinary plant stove.

CODIÆUM.—See CROTON.

COFFEA.—The Coffee Tree, C. arabica, South Abyssinia, is a stove evergreen shrub, that attains a height of 5 to 15 feet, and produces white, sweet-scented flowers in axillary clusters, during September, which set fruit freely. It may be easily raised from seed, sowing in brisk heat during March, but plants raised from cuttings are the more floriferous. Insert cuttings of firm wood in sandy soil, under a bell-glass, in a temperature of 80°. Pot either seedlings or cutting-raised plants in a mixture of two parts fibrous loam to one of leaf soil, adding sharp sand, and give timely shifts from small pots into larger sizes. An ordinary stove temperature and a moist atmosphere suits the Coffee Tree.

COLUMNEA.—C. Kalbreyeriana is the only species of this genus of stove evergreens that finds favour among British plant-growers. It is of a trailing habit of growth, and proves a good companion for—also requiring the same treatment as—Æschynanthus. See page 270.

COMBRETUM.—This genus of stove evergreen climbers comprises two gorgeous species that are well worthy of inclusion in limited collections of plants. C. grandiflorum, Sierra Leone, is a hairy plant, and produces a profusion of short axillary and terminal spikes of scarlet flowers from May to July; C. purpurea is, however, the more popular. It is of moderately strong growth, producing large sprays of purplish-crimson flowers in July. Combretums are propagated by cuttings, giving preference to stiff side-shoots taken off with a thin heel of old wood attached. Insert them in sand, or very sandy soil, in a temperature of 80°, and cover with glass. When rooted, place them singly in small pots, and keep the plants close and shaded till well-established. Gradually shift into larger sizes, or, what is more to the purpose, plant in narrow borders or well-drained tubs. The soil used may consist of a mixture of equal parts of fibrous loam, peat, and leaf soil, with a free addition of sharp sand. The loam and peat should be in a coarse state for large pots, tubs, or borders. Plant or pot firmly. Supply abundance of water to the roots during the growing and flowering season, and moderate quantities during the late autumn and winter months. Train the plants up pillars, and over girders or archways, which they will drape attractively. After the flowering is over, thin out the weaker growths rather severely, shorten the stronger slightly, and tie all in neatly. In February commence syringing the plants on sunny days, continuing the practice more freely as the days lengthen, and not ceasing till the flowers are expanding. What other cleaning is necessary ought to be done during the resting period of the plants.

CORYNOSTYLIS.—A small genus of stove-climbing shrubs, producing white flowers, bearing some resemblance to a Tropæolum. C. Aubleti, Guiana, is the only species described and cultivated, and of this, albiflora is a desirable form. Propagation is effected by inserting cuttings of young wood in sand, plunging the pots in a brisk bottom heat, covering with glass and keeping the sand uniformly moist. Plants can also be raised from seeds, and they thrive and flower under ordinary stove treatment.

COSSIGNEA.—C. pinnata, from Mauritius, is the only species catalogued. It is an ornamental stove shrub, and produces panicles of white flowers. Propagated by cuttings of ripe wood, inserted in sand, and plunged in brisk bottom heat. A mixture of two parts loam to one each of peat and sand is suitable for the plants, which must have well-drained pots and abundance of water.

CRINUM.

Of this large family of bulbous-rooted plants, four species only are named as being worthy of general cultivation in plant stoves. C. amabile, Sumatra, forms leaves 3 to 4 feet long and 3 to 4 inches broad, tapering to a point. The flowers are 3 to 4 inches long, and twenty to thirty of these in an umbel are borne on a scape 2 to 3 feet in length; colour bright red; summer. C. Macowani, Natal; hardier than the preceding succeeds well in a warm greenhouse; leaves 2 to 3 feet long, 3 to 4 inches broad, and the bulb 9 to 10 inches in diameter. Flowers ten to fifteen in an umbel borne on peduncles 2 to 3 feet long, large in size; colour white tinged with purple; November. C. Moorei, Natal, also succeeds best in an intermediate temperature; leaves 2 to 3 feet long and 3 to 4 inches broad, while the bulbs measure 6 inches in diameter. Flowers six to ten in an umbel, of medium size, supported on peduncles 1½ to 2 feet long; colour greenish white flushed with red; spring or autumn. C. purpurascens, Fernando Po (Fig. 142, next page), forms numerous leaves, these being 18 inches to 3 feet long and 1 inch broad. Flowers five to nine in an umbel; colour white tinged with purplish red; summer.

Flowering plants are the most quickly obtained by means of offsets, detached from the larger bulbs in March, securing as many roots as possible with them. Place the offsets in pots that will hold the roots conveniently, and keep them growing strongly in a moist stove all the year round, without attempting the drying process till the plants attain to a flowering size. Raising plants from seed is a very simple matter, only it frequently takes three years to grow them to a flowering size. The seed is very large and should be sown as soon as ripe, one in a 3-inch pot, in a temperature of about 75°, keeping the soil somewhat dry, but not too dry, till germination takes place, when more water will be required. The plants must not be kept starving in small pots, but should receive timely shifts into larger sizes, providing ample drainage to carry away the copious supplies of water that must be given. Strong bulbs will flower in due course.

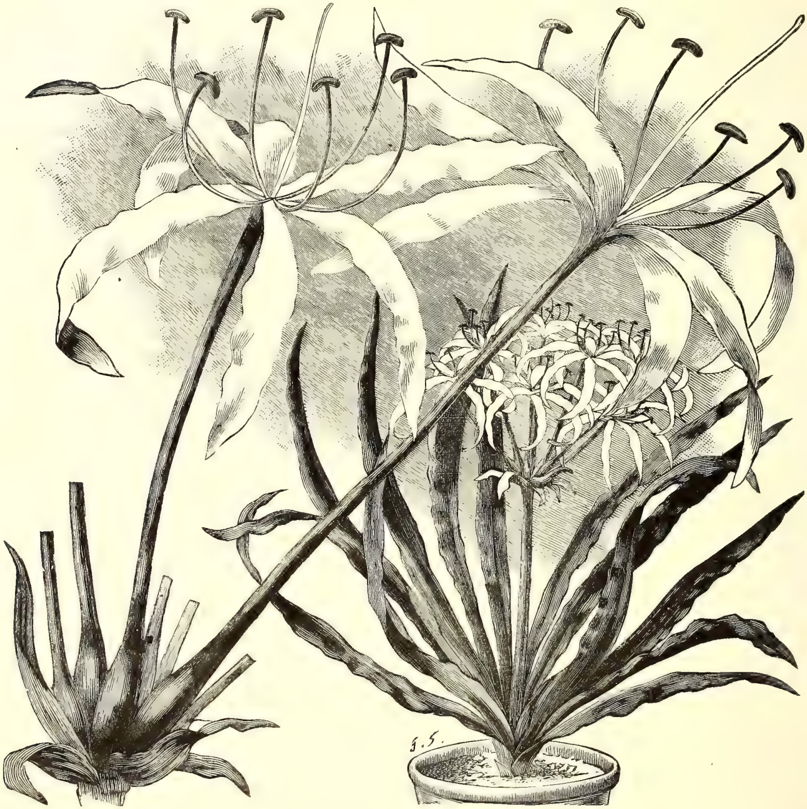

Fig. 142. Crinum purpurascens.

After flowering, or during the winter or resting period, water should be partially withheld, and the plants exposed to all the light and sun possible. In the spring or when growth commences, any in comparatively small pots may be given a liberal shift. When Crinums are established in large pots or tubs, the roots need not be disturbed, but the top soil may be removed annually, and fresh enriched loam substituted. What is termed a lumpy compost ought to be used for all but the smaller plants. A suitable mixture consists of two parts fibrous loam, one part fibrous peat, with charcoal and sand added freely. During the growing period strongly-rooted plants must have copious supplies of water, varied with liquid manure.

CROSSANDRA.—C. undulæfolia, East Indies, deserves inclusion in select lists of stove plants. It is an evergreen flowering shrub, which attains a height of 1 to 3 feet, and produces spikes of handsome, reddish-orange flowers with great freedom in the autumn. Cuttings of shoots 2 to 3 inches long, inserted in sand, and plunged in a bottom heat of 75°, covering with a bell-glass, root freely at almost any time of the year. From small pots, gradually shift the plants into larger sizes, employing equal parts of loam and peat, mixing in sand freely. They thrive best in a moist, warm atmosphere, and require copious supplies of water during all but the winter months.

CROTON (CODIÆUM).

Croton is the generic term erroneously applied to Codiæum, but the old familiar name is retained here owing to its established popularity among nurserymen and cultivators generally. Because of the different structural character of the flowers, botanists regard the two genera as distinct, and they form separate tribes of the Order *Euphorbiaceæ*, or extensive spurgewort family. They are not grown for the beauty of the flowers, any more than the box-tree is (which belongs to the same Order), but for the beauty of the leaves, and it will be long before the familiar term Croton is superseded by Codiæum.

Among plants with ornamental foliage Crotons stand pre-eminent. Whether viewed in the plant stove or exhibition tent, or employed for house and table decoration, they invariably attract admiration—always provided they are in a healthy, highly-coloured condition. Their habit of growth, elegance in some cases and boldness of leafage in others, together with diversity in variegation and richness of coloration, are all points in their favour which no decorator or exhibitor can overlook. It is true they are frequently to be met with in a deplorable state, but this is more the result of unsuitable means for, or errors in, cultivation than of inherent weakness of the plants themselves.

Crotons can be raised from seed, but this method of propagation is chiefly confined to hybridisers or raisers of novelties. Plants are easily increased by cuttings, during the greater part of the year, or when it is possible to maintain a temperature of 75°; but March and April are perhaps the best months for the purpose. Select firm tops, well-furnished with healthy leaves, not hard and stunted shoots with only a few leaves on them; cut the stems cleanly across just below a joint, and trim off the lower leaves; insert the cuttings singly in small pots filled with sandy peat, the base of each cutting having some sharp sand to rest upon, and fix firmly. Where the leaves are long and drooping, loop them rather closely to a small stick placed in each pot for the purpose. Plunge the pots in brisk bottom heat, cover with a bell-glass, hand-light, or frame, and afford shade from the sun. If much moisture collect on the glass, wipe it off with a cloth every morning. Under these conditions the cuttings should produce roots without the loss of any leaves, and neat little plants will soon be ready for larger pots. Larger tops may be placed with their ends in bottles kept filled with water, and in brisk, moist heat roots will soon be emitted. From the bottles transfer the plants to small pots, taking care to surround the roots with warm soil, and keep them in strong heat and a moist atmosphere till they are well-established.

Handsome tops, large enough to use for table decoration, may be first furnished with roots and then detached from the parent plant without the loss of leaves. This method of rooting the tops is shown in Fig. 143. At the selected part the stem should be cleared of leaves, and then cut half through below a joint, an upward cut forming a tongue, as shown. This tongue ought to be wedged open and the stem at that place encircled with moss (*a*), enclosing, if preferred, sandy soil; but this is not essential. The plants so operated upon must be kept in strong moist heat, and the moss never allowed to become dry. In the course of a few weeks roots will be emitted, as shown in the sketch (*c*), when the tops should be detached from the stems. If strongly rooted they may be placed in 4-inch pots, a handy size for table decoration, and the rest in smaller sizes. Not till they have become well-established in the pots ought these rooted tops to be exposed to much sun or dry air, but subsequently they may be arranged on shelves, or suspended near the glass, where they will colour grandly. It must, however, be borne in mind, when Crotons are strongly rooted and retained in small pots, that abundance of water, liquid manure, and frequent syringings are imperative for keeping the plants bright and healthy.

Crotons, whether required for grouping or for house and table decoration, are the most effective when grown with a single stem and furnished with well-developed leaves from near the pot to a height of 1 foot to 3 feet. Such plants can only be obtained by good cultivation and rapid growth. The start must be made early in the year with well-rooted plants, the stems of which are not unduly hard, nor the points crippled by insects or exposure to cold air. These young plants should be turned out of their pots in February, have all unoccupied soil picked away, and the roots carefully loosened without breaking them, prior to shifting into pots one or two sizes larger than the plants were in before. For this and all other pottings a suitable compost will be found in a mixture of three parts fibrous loam to one part each of peat and leaf soil, with a free sprinkling of silver sand. Let the loam and peat be chopped or broken up into coarse lumps for the larger pots, and press the soil in them somewhat firmly. Keep the young plants by themselves on a stage that can be kept constantly moist. Platforms over heated water tanks suit large Crotons in particular better than any other position. Supply water carefully, never letting the plants become anything like dust dry at the roots, and syringe them once, if not twice, daily. Those required to grow tall for grouping and house decorating should be shifted into 8-inch or slightly larger pots before the roots become matted together, as shown in the illustration on page 263. Crotons, when established, ought not to be shaded, except during the hottest part of the day, or the colouring of the leaves will not be good. Towards the time they are required for house and temporary conservatory decoration, they ought to be arranged in positions where they will receive more air than formerly, this preparing them for cooler and more exposed quarters. When they have lost, or are losing, their lower leaves, root the tops as before advised.

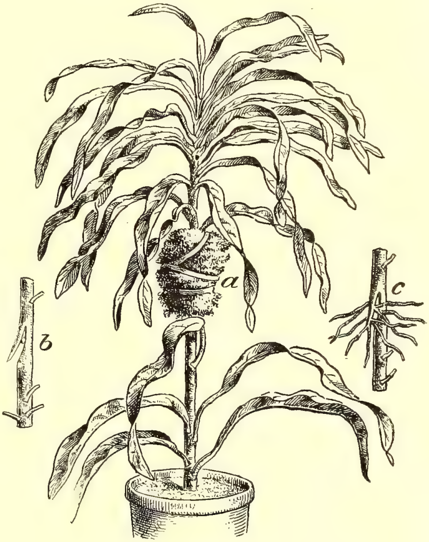

Fig. 143. Method of Propagating Crotons.

References: *a*, top "tongued" and mossed; *b*, stem showing the tongue; *c*, the same after roots are emitted in the moss.

If bush-shaped specimens are desired, top the young plants at the outset, and again after they have formed three or four shoots. In all other respects treat similarly to untopped plants. Some of the finer leaved varieties, such as the Countess and interruptus aureus, branch naturally and grow strongly without topping, and develop into handsome pyramids. Crotons not unfrequently lose their leaves during the winter owing to being subjected to a much lower temperature and a drier heat than formerly. If they were grown in a temperature of 75° to 85° during the summer and early autumn months, the fall should not be below 60° to 70° in the late autumn and winter, and the more the hot-water pipes are heated the greater the need for preventing undue dryness in the atmosphere by occasionally syringing the plants, pots, walls and floors. Large bushes

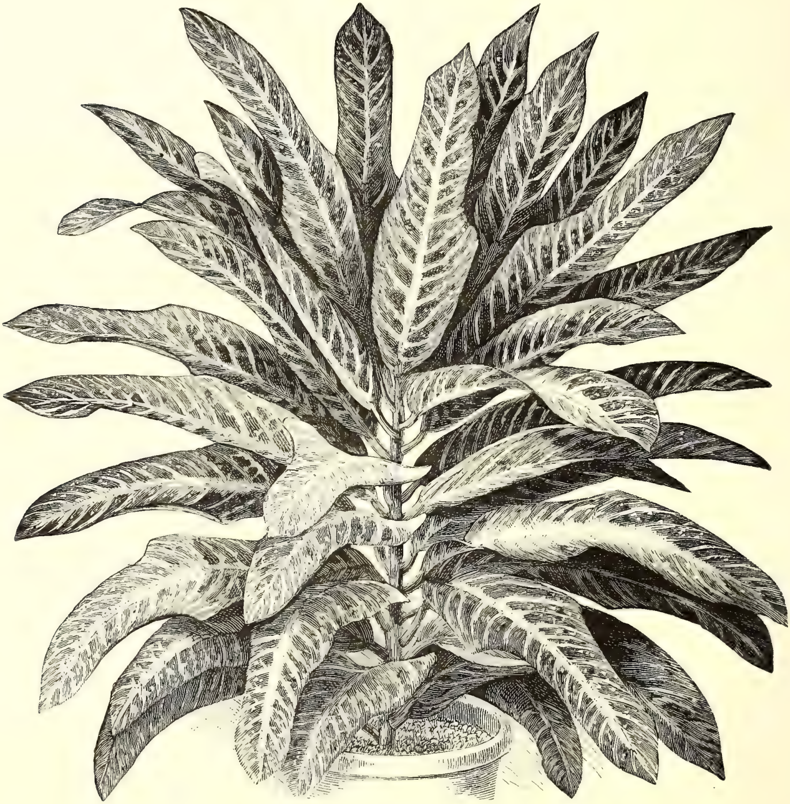

Fig. 144. Croton Russelli.

and pyramids, as previously indicated, are not of the most service for ordinary purposes, but are frequently required for the exhibition tent. Each succeeding year plants intended for that purpose should be severely pruned, shortening the branches and leader, if any, according to the style of training adopted—in February, earlier rather than later, for unless strong growth is formed early in the season, there will not be time for the foliage to assume its most brilliant colour.

The pruned plants will break strongly and quickly in brisk heat and a moist atmosphere, and before the shoots have made any marked progress, turn the plants out of pots, reduce the soil and roots sufficiently to admit of re-potting in the same sizes the plants were in before. Thus treated yearly, large specimens can be kept in comparatively small pots. Careful attention is necessary in maintaining high temperatures and a moist atmosphere also in syringing, watering, and feeding. Those branches that require it must be tied out and the plants elevated near the glass to hasten their coloration.

Insect pests are apt to disfigure neglected Crotons. Red spider and thrips, if allowed to get the upper hand, will cause the leaves to drop, while mealy bug and scale disfigure and injure the plants. Frequent syringings and the maintenance of a moist atmosphere are the best preventives of red spider and thrips, and nicotine vapour destroys them. Syringing with the hot water, soft soap, and petroleum mixture applied as recommended on page 263, will rid the plants of scale and mealy bug, but this should be done during the winter while the plants are resting.

VARIETIES OF CROTONS.

All the numerous varieties in cultivation originated from about four species in the form either of seedlings or sports. With so many beautiful forms to choose from, it is not easy to decide on the best for all purposes, but the following will be found suitable for table decoration and exhibition as suggested.

Selections.

* AIGBURTHIENSIS, slender growing, narrow leaves, yellow.
†* ANGUSTIFOLIUS, long, narrow wavy leaves edged with yellow.
† BARON DE ROTHSCHILD, large crimson leaves.
†* COUNTESS, long narrow leaves, prettily drooping, yellow.
* ELEGANS, slender growing, yellow.
* FLAMBEAU, long, narrow, recurved leaves, red and yellow.
†* INTERRUPTUS AUREUS, elegant drooping leaves, yellow.
†* JOHANNIS, long, narrow, recurving leaves, blotched with yellow.

* Varieties for table decoration.

† Suitable for growing into specimens.

SELECTIONS—(*continued*).

†* MAJESTICUS, narrow arching leaves, yellow changing to red.
†* MORTEFONTANENSIS, leaves three-lobed, yellow and red, changing to crimson.
MRS. DORMAN, narrow, upstanding leaves, variegated.
* NEWMANNI, ovate leaves, highly coloured.
† NOBILIS, narrow arching leaves, red and yellow, with red stems.
†* PRINCE OF WALES, bold-growing, handsome variety.
† QUEEN VICTORIA, long broad leaves, blotched with yellow, changing to red and bronze.
† RUSSELLI, dense, erect-growing, leaves bronzy green spotted and veined with yellow and red.
† SUNSET, lance-shaped leaves, marbled vivid red and yellow.
† THOMPSONI, large, broad leaves, striped and blotched with yellow.
† WARRENI, long, pendulous curiously twisted leaves, yellow changing to crimson.
† WILLIAMSI, large ovate leaves, veined with shades of red and yellow.

* Varieties for table decoration.

† Suitable for growing into specimens.

CURCULIGO.—C. recurvata, East Indies, and its variegated form, C. recurvata variegata (Fig. 145), are handsome, palm-like plants worthy of a place in tropical collections. They are distinctly ornamental and easily cultivated. Propagation is effected by suckers taken off strong plants in March, inserting them singly in small pots, in a temperature of 80°. Serviceable plants can be grown in 5-inch and 6-inch pots, employing a lumpy compost of peat and loam in equal parts, with a free addition of silver sand. Afford good drainage and abundance of water.

CURCUMA.—Of this genus of stove herbaceous plants two species only are recommended for general culture. C. cordata, East Indies, attains a height of 1 foot, and produces central spikes of reddish-yellow flowers in July; C. Roscoeana, East Indies, has larger leaves, and gives spikes of scarlet flowers with bright orange bracts in August. They are increased by division of the roots in February and March. Pot in a mixture of two parts peat to one of loam, with a little sand. Grow in an ordinary stove temperature. The leaves die down in October and reappear in February.

CYANOPHYLLUM.—When at its best C. magnificum is one of the grandest ornamental foliage plants in cultivation. It is a native of Mexico, and most effective when grown with a single stem. The leaves are 1 foot to 2½ feet long, and from 9 to 12 inches broad, tapering to a point. The upper surface is of a beautiful velvety-green, midrib and primary veins ivory white, the underside reddish purple, and the veins prominent. It is propagated by short lengths of stem and eyes, inserted in sand, and the pots plunged in bottom heat of 80° to 85°. When the young plants require a shift from small pots into larger ones employ well-drained pots, and a mixture of equal parts peat and leaf soil with abundance of sand. Pot firmly. The plants succeed best in a moist, shady position, and should never be allowed to become dry at the roots. This plant is very liable to be overrun by mealy bug, but no strong insecticide ought to be employed, as this is apt to disfigure the foliage. Sponge lightly with weak soapy water for cleaning the leaves.

Cyperus.—See Commercial Floriculture.

CYRTOCERAS.—C. multiflorum, a Borneo species, of which there are various synonyms, is a stove evergreen twiner, and nearly allied to Hoya. It attains a height of 3 to 5 feet, and produces white and buff flowers, in drooping umbels, during August. It is propagated by short cuttings of firm shoots, inserted in pure sand under a bell-glass in brisk bottom heat, any time from March to July. Suitable soil consists of equal parts fibrous peat and sandy loam, with small pieces of charcoal added freely. The pots must be well-drained and not large. Train the plants over a trellis. Avoid overwatering

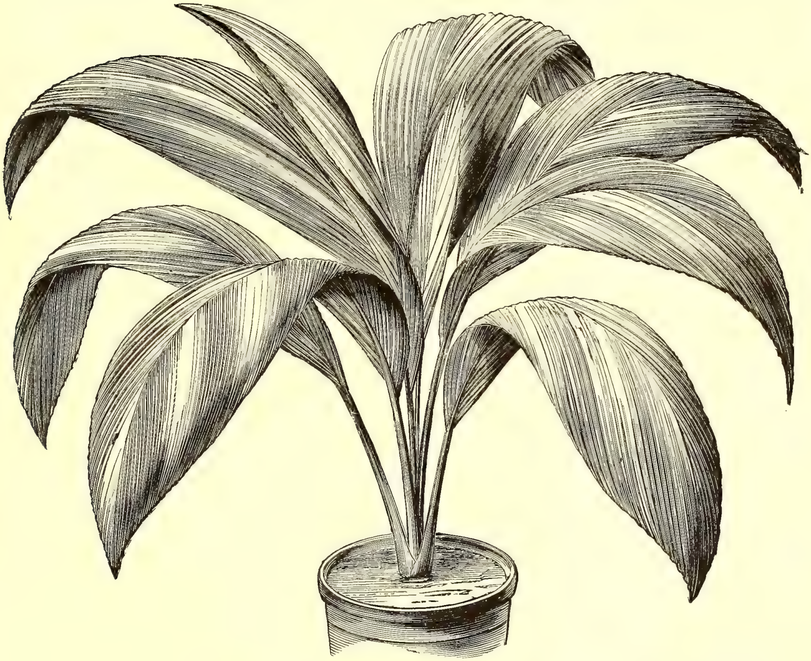

Fig. 145. Curculigo recurvata variegata.

during the growing season, and keep them somewhat dry at the roots during the winter.

DALECHAMPIA.—D. Roezliana is the only species of this genus in cultivation, and has not become so popular as was anticipated when it was first introduced. It is a dwarf evergreen shrub. The beauty of the inflorescence consists in the coloured bracts. There are both rose and white forms. Propagation is effected in the spring by cuttings inserted in sandy peat, under glass, in a temperature of 80°, and the plants thrive in a mixture of equal parts loam, peat, leaf soil and sand, under ordinary stove treatment.

DICHORISANDRA.—Comprised in this genus of stove herbaceous perennials are species which have both attractive flowers and ornamental foliage. D. musaica, is a noteworthy instance, having prettily veined leaves, and bright azure-blue flowers in terminal trusses in the autumn. Regina, tænensis, and undata are also desirable species. All can be increased either by division, cuttings, or seeds. Pot the plants in equal parts of loam, peat, leaf soil, and silver sand. They succeed on a close, damp stage in an ordinary stove temperature, whence they can be shaded from the sun, and receive abundance of water during the summer. Keep them moderately dry at the roots during the winter, and they must not be then subjected to the low temperature of a greenhouse.

DIDYMOCARPUS.—Of this rather large genus of stove herbaceous perennials only a very small number of species are considered worthy of cultivation. D. crinita, from Palo-Penang, attains a height of 1 foot, and produces white flowers, tinged with purple, on peduncles, two to five together, in July. The primrose-leaved species (D. primulæfolia), from Ceylon, produces lilac flowers freely in November; but neither of the foregoing is so attractive as the more recently introduced D. malayanus. The leaves of this novelty are about 3 inches long, prettily veined and hairy. Well-grown plants afford a profusion of primrose flowers, with a darker yellow blotch in the lower segments of the limb, borne on erect peduncles during the summer. Cuttings of young side-shoots, obtained from plants just commencing growth in March or April, root freely in sandy soil under a bell-glass, in a temperature of 80° to 85°. Pot the young plants in equal parts of peat and loam, with a fourth part of fine cow manure and some sand intermixed. They will thrive and flower in ordinary stove heat, and should be rested in a temperature of 55° to 65°, keeping them somewhat dry. Re-pot and start the plants into active growth in February or March.

DIEFFENBACHIA.

Although not quite so showy as a few other stove plants grown solely for the beauty of their leaves, yet some of the representatives of this genus of erect, evergreen perennials are distinctly ornamental, and they are of comparatively easy culture. There are a fairly large number of species available, and of these the following will be found a good selection: D. Baraquiniana, Brazil: height 3 to 5 feet, with leaves 6 to 12 inches long and 3 to 6 inches wide; green, spotted with white; midrib and petioles also white. D. Bausei: a garden hybrid; broad leaves, yellowish-green, margined and blotched with dark green, and profusely spotted with white. D. braziliensis, Brazil: handsome and distinct; dark green leaves, suffused with blotches of white and pale green. D. Leopoldi, South America: one of the best; leaves deep, lustrous satiny-green; midrib broad, ivory

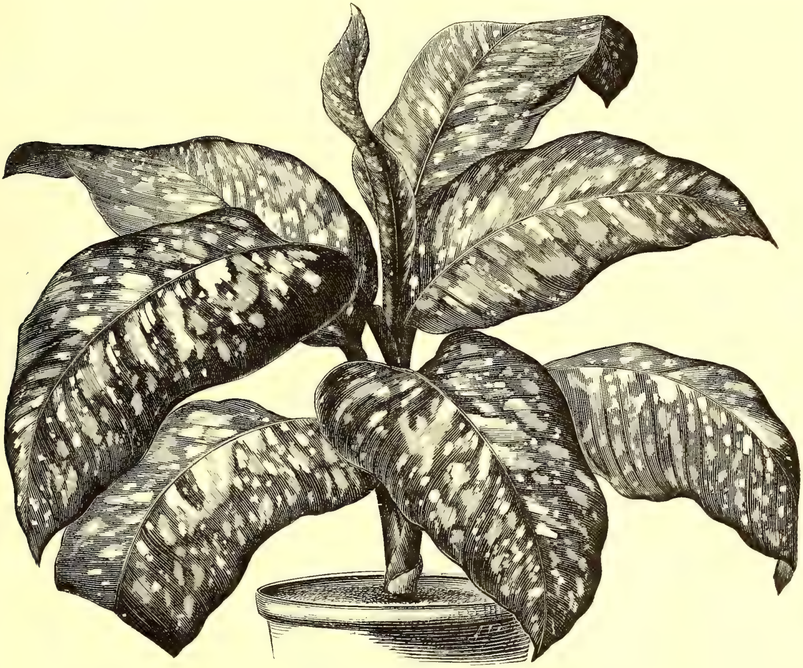

Fig. 146. Dieffenbachia picta.

white, bordered on each side with a whitish band. D. magnifica, Venezuela: leaves shining sombre green, thickly variegated with blotches and spots of white, these following the direction of the secondary nerves, rendering the plant distinct in appearance. D. picta, Tropical America: the best-known species, but is giving place to superior later introductions. D. Regina, South America: leaves almost wholly covered with greenish white, mottled with blotches of pale green, and is very distinct and good. D. Rex, South America, is also a handsome species. In this instance the leaves are deep green, passing to a paler green near the edge, the whole surface, to within one half-inch of the margin, being thickly covered with white blotches, which take the same direction as the venation.

Dieffenbachias are propagated in the spring by cuttings of the stems, about 2 inches long, inserted in sandy soil in a close frame, with a temperature of 75° to 80°. When well-rooted and young shoots are forming, place the plants singly in small pots, and keep them on a moist stage or mild hot-bed in brisk heat. Before they receive a check, shift into larger pots, employing a compost of equal parts fibrous loam and peat, with one-fourth part of well-decayed manure and sand. They make the best progress if kept in a moist, partially shaded position, and should have abundance of water, varied, when the pots are full of roots, with liquid manure. Strong young plants in 6-inch or rather larger pots are the most serviceable for either house decoration or heated conservatories. When they lose their lower leaves, and, therefore, much of their beauty, they may be either thrown away, saving the stems for propagating purposes, or they can be headed down in February or March, and made to produce one or several stems as desired.

Re-potting should take place when fresh growths are commencing, at which period the old balls of soil and roots may be freely reduced in size, and returned to pots no larger than they were in before. If specimens are desired, retain all the shoots that form on the cut-down plants, and shift into larger pots before they become root-bound. The juice of Dieffenbachia is acrid and poisonous, and no part of the plant should ever be placed in the mouth.

DIOSCOREA.—Yam. Two species of this genus, D. discolor and D. retusa, are considered sufficiently ornamental for cultivation in plant stoves. They are propagated by dividing the tubers before these commence growing. A rich loamy soil suits the plants, and the growths should be trailed where they will show to advantage. When the tops turn yellow withhold water, and winter the tubers in a warm room.

DIPLADENIA.

Among stove climbers few equal Dipladenias for the boldness and brilliancy of their flowers. They give a rich reward for good culture, but are disappointing unless skilfully treated. For exhibition purposes they are greatly valued, well-grown, perfectly flowered specimens invariably gaining a maximum number of merit marks from the judges.

The most desirable Dipladenias have resulted from crossing such species as D. crassinoda with D. splendens, the seedlings obtained combining the good properties of both, further improvements having been effected by intercrossing and seed-saving. D. amabilis produces large rosy-crimson flowers in clusters from May to September. The flowers of D. amœna are pink, suffused with rose. D. Brearleyana is equally floriferous and even more beautiful; flowers very large, pink when they first open, changing to the richest crimson with age. D. carissima, another garden variety, has soft, delicate blush-pink flowers, while those of D. insignis are rosy purple, and the growth stouter than that of most other varieties. D. splendens profusa bears a general resemblance to D. amabilis; flowers carmine. In D. splendens Williamsi we have the best of the pinkish-white varieties. D. boliviensis is a distinct species, of a free floriferous habit, and deservedly popular, well-grown plants affording an almost endless supply of blooms for cutting; flowers seldom more than 2 inches across, white, with a rich yellow throat.

Dipladenias are chiefly propagated by cuttings of young side shoots taken from newly started plants, and inserted in pots of sandy peat, covered with glass, and given the benefit of brisk bottom heat, or they may be set on an ash-covered stage, and covered with a bell-glass, a temperature of about 80° being required. Single eyes of firm wood may also be rooted similarly. The young plants first established in small pots are gradually shifted into larger sizes, clean, and extra well-drained, using a mixture of fibrous peat, silver sand, and a little charcoal. For the larger pots the peat ought to be decidedly lumpy, and a little charred soil mixed with it serves to keep the whole sweet, even when weak liquid manure is applied. Dipladenias are not vigorous rooting, and may easily be over-potted, or over-watered, thus making the soil sour when satisfactory progress is impossible. Young plants rarely attain to a flowering size the same season they are rooted, but should be grown strongly, with a view to having as many flowers during the next year as possible. A temperature of 60° to 65° is suitable for resting the plants, giving only sufficient water to keep the wood plump.

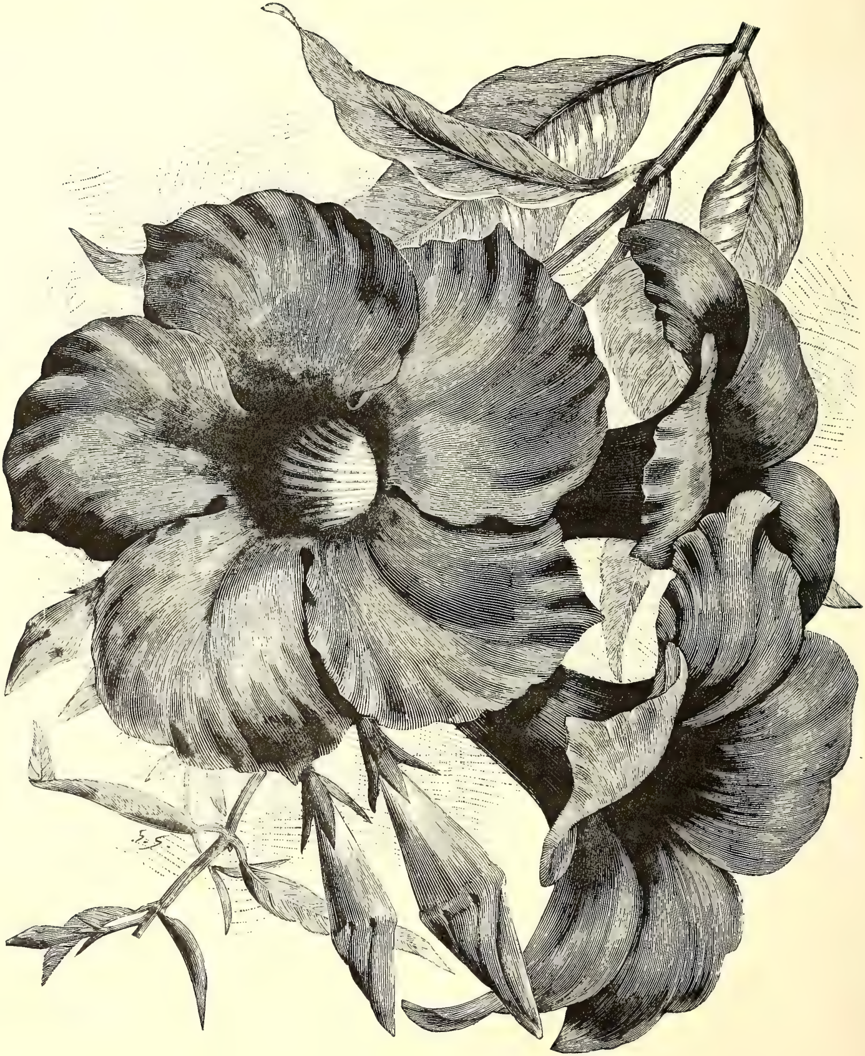

Fig. 147. Dipladenia splendens profusa.

Early in the winter lightly shorten the growths, and in February introduce the plants into a temperature 5° to 10° higher, accompanied by more moisture in the atmosphere. When fresh growth begins, turn the plants out; remove all soil that is unoccupied by roots, and if the plants are in good health, not otherwise, place them in pots, one or two sizes larger than they were in formerly, as this is the only shift to be given during the season. Elevate the plants on inverted pots, as the young growths fail to flower unless trained near the glass. If exhibition specimens are desired, the young growths must first be trained up strings and over the roof trellis, taking them down and carefully disposing them over a globular trellis after they have commenced flowering freely. In subsequent years the treatment consists of late autumn pruning, removing the old flowering ends and weakly growth, leaving enough young wood to thinly cover a trellis; resting, re-starting, and re-potting much as advised in the case of the younger plants. It is important to remember that the best possible judgment must be exercised in watering, proceeding with great caution till the soil is well occupied by roots.

D. boliviensis grows and flowers freely nearly all the year round in moderately large pots, but is more luxuriant, and the flowers are larger and more abundantly produced when the plants are rooting in a small border of peaty soil. Train the growths up pillars and over archways. The choicer kinds, such as amabilis and Brearleyana, also succeed in a narrow raised border, and trained thinly under the roof, allowing the long flowering stems to hang down and display their gorgeous blooms to the best advantage. Treat them, as regards resting and pruning, similarly to pot plants, but D. boliviensis is more of an evergreen, also flowers late in the season, and may be pruned in the spring.

INSECTS.—Mealy bug has been responsible for many failures with Dipladenias, this pest having a great partiality for them. If the cleaning is delayed till the young growth has made much progress, it is next to impossible to do it properly, as the leaves are most susceptible of injury from insecticides and rough handling. The plants ought to be thoroughly cleansed while resting, using small but not very stiff brushes for the wood or joints, and a sponge and soft soapy water for the leaves. This will not wholly eradicate the bug, and a close look out must be kept for any that escape, destroying them before they have a chance to form colonies on their own account.

DRACÆNA.

What are known as Dracænas among the multitude of plant-growers, are classed as Cordylines by botanical authorities. The more popular and well-established term will be retained in this work, as it meets all cultural purposes, and a change to scientific accuracy would lead to confusion. The majority of the elegant, highly coloured, Dracænas, largely employed for house and table decoration, originated in the form of seedlings from D. (Cordyline) terminalis, a species with bronze and crimson leaves, introduced from the South Sea Islands, and still extensively grown. Selections of varieties will be duly appended.

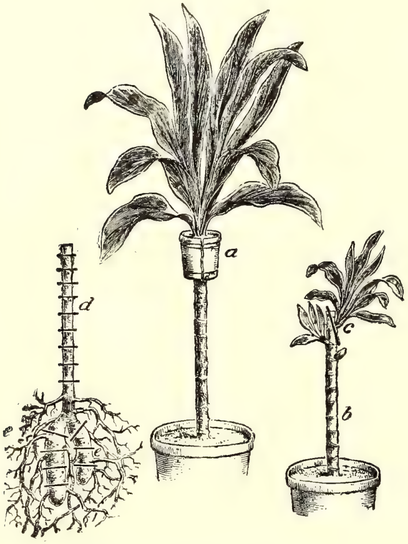

Fig. 148. Propagating Dracænas.

References : a, rooting tops *in situ*; *b,* stem after removing the top ; *c,* cutting marked for detaching from stem ; *d,* stem marked for division ; *e,* root cuttings.

The following are a few species also worthy of cultivation. D. draco, Dragon Tree, in its native country (Canary Islands) develops into trees 40 feet high. It is the most effective, in a small state, or before the stems have branched. The leaves are glaucous, small, and disposed in a crowded head. D. fragrans, green, is still grown, but superseded by its variety Lindeni, which forms large, recurving green leaves, traversed their entire length by bands of creamy white and shades of yellow. D. Goldieana, introduced from Tropical Asia in 1872, is a remarkably handsome and distinct species, of erect habit, the broad leaves, closely set, stalked, and spreading, having yellowish green ribs, and are marbled and irregularly banded with dark green and silvery grey in alternate straight bands. D. Sanderiana is also a distinct and effective species. The stems are erect, the waved leaves green with a broad margin of light yellow, changing to cream white (see page 328). It is a welcome addition to elegant ornamental foliaged plants, suitable for warm conservatory and house decoration.

Dracænas can be raised from seeds, sowing in light sandy soil in March, but established varieties are increased by cuttings of side-shoots, stems, and roots. Tops taken off old stems will emit roots in a briskly heated close frame, but are apt to lose the best portion of their leaves. The better plan is to treat these tops similarly to Crotons, see page 315. Some growers prefer to follow the method shown at *a*, Fig. 148. In this instance, after tongueing the firm stem where it is desirous roots shall form, it is encircled by a small pot, carefully split in halves, and made to enclose a little fine loam, peat, and sand. This has to be kept uniformly moist, and when well occupied with roots, the heads are cut from the stem close under the pots, and soon afterwards the plants are moved into others 5 inches in diameter. After the stems have been topped they push side-growths from the uppermost joints. These, when as large as shown at *c*, are cut off with a heel, inserted in a 2-inch pot, and plunged in a propagating frame to produce roots. Other growths will push in turn from the stem *b* for similar treatment. In this way a good stock of neat plants can be raised

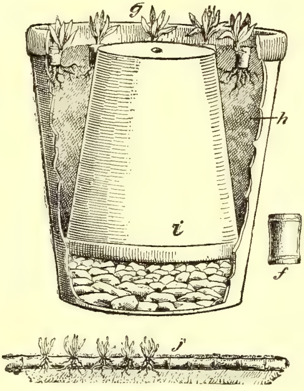

Fig. 149. PROPAGATING DRACÆNAS.

References: f, stem cutting from *d*, Fig. 148; *g*, stem cuttings rooting; *h*, soil; *i*, inverted pot and drainage; *j*, stem and plantlets (see text).

If a number of young plants all of one size are desired, the stems *d* may be cut up into short lengths each with two joints (*f* Fig. 149), and inserted in sandy peat soil round the sides of a pot *g*, with an inverted pot, *i*, in it as shown. Only the top of the cutting should show above the soil, taking care to fix the thickest end downwards. If the pots are plunged in brisk, moist heat, and the soil never allowed to become dry, every cutting will produce roots and leaf growth as shown, the plants being then ready for placing separately in small pots. When raised in large numbers a quicker plan is adopted. Instead of cutting up the stems, they are laid their full length, *j*, about 2 inches apart, and covered an inch deep in a warm, moist bed of cocoa-nut fibre refuse in the close frame of a propagating house. In a short time young plants appear in hundreds or thousands, as if they were being raised from seeds, producing roots at the base of the leaves, and are then potted separately, as above advised.

Plants are also raised from fleshy "roots" (*e*, Fig. 148), cut into short lengths as

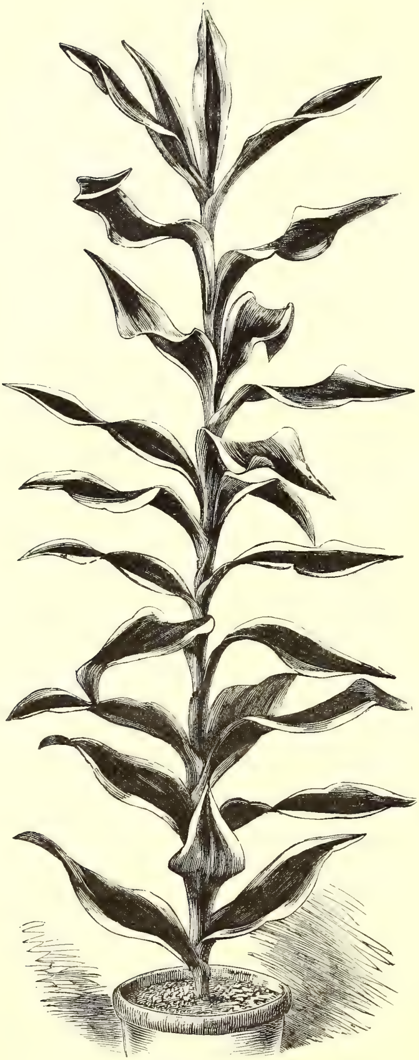

Fig. 150. Dracænia Sanderiana.

marked, and treated similarly to stem cuttings, which in fact they are, the stem dividing, elongating, and swelling within the soil.

Dracænas are of the most service when from 1 to 2 feet high and well furnished with leaves down to the soil. For this class of plants 5-inch and 6-inch pots are large enough, but if taller specimens are desired a shift into 8-inch or 9-inch pots should be given before the roots become much matted together, or an early loss of the lower leaves will follow, and the plants spoiled. A compost of two parts peat to one of loam and sand, not breaking up the peat too finely, is suitable for Dracænas. The young plants will make the best progress if arranged somewhat thinly on an ash or spar-covered slate staging along the fronts of forcing-houses and ordinary plant stoves. After they have well occupied the soil with roots, they must have abundance of water, weak clear liquid manure being of great service in maintaining the health and colouration of the plants for a long time in small pots. A free use of the syringe tends to keep the leaves free from insect pests, but a timely sponging with soapy water is further needed occasionally on the first signs of the presence of mealy bug or thrips. Plants intended for the summer decoration of conservatories, and for house and table adornment, ought to be partially hardened before subjecting them to this ordeal.

SELECTION OF TWENTY DRACÆNAS.

ALBERTI, slender growth, leaves bronze and crimson.
ANGUSTIFOLIUS, long, narrow leaves, green, margined crimson.
BAPTISTI, bold, leaves green, striped yellow and pink.
BAUSEI, small recurving leaves, margined and striped with red.
COOPERI, bold recurving leaves, deep-red.
ELEGANTISSIMA, long, narrow recurving leaves, green and red.
GLADSTONEI, bold leaves, dark rich crimson.
GOLDIEANA, broad leaves, banded with dark green and silvery-grey.
GUILFOYLEI, narrow leaves, striped red and white.
GRACILIS, long narrow leaves, green.
JAMESI, dwarf; narrow leaves, highly coloured.
LINDENI, leaves broad and recurving, green, broadly margined and striped with yellow.
LORD WOLSELEY, medium recurving leaves, dark-crimson.
NIGRO-RUBRA, bold, erect growth, dark-brown and crimson.
PRINCE CHARLES OF DENMARK, leaves narrow, recurving rose-tint, deepening with age.
SANDERIANA, distinct, beautiful and valuable.
SPLENDENS, dwarf and compact, rosy-carmine.
TERMINALIS, free growth, bronze, and crimson.
,, alba, leaves, dark-green and white.
WILLSI, medium, rich crimson.

ERANTHEMUM.—Comprised in this genus are species cultivated for the beauty of their flowers, and others on account of the attractiveness of their foliage. E. Andersoni, India, deserves a place in most plant stoves. During the autumn strong plants produce long spikes of flowers, the upper and lateral lobes of which are pure white, and the lower segments thickly dotted with crimson-lake, margined with white. The spikes produce a second series of flowers immediately after those first formed have dropped. E. Cooperi (Fig. 151), New Caledonia, is similar in character, having white and purple flowers. E. argenteo-marginatum, Polynesia, has leaves 6 inches long and 2 to 3 inches broad, broadly margined with white. E. igneum (syn. Chamæranthemum igneum) has leaves with red veins; E. pulchellum, the best-known species, is of a sturdy branching habit of growth, and in the winter produces strong spikes of beautiful blue flowers. E. sanguinolentum, Madagascar, has red veined leaves. All are propagated by cuttings of young shoots that are produced in the spring by plants recently cut down. Insert these in sandy peat, and either plunge the pots in a propagating frame, or cover with a bell-glass in a temperature of 75°. When well rooted, place the plants singly in 3-inch pots, and keep them growing in brisk heat and a moist atmosphere. Top to make them branch, and when fresh shoots are showing shift the plants into 5-inch or 6-inch pots. If large plants are required, top the shoots once more, and give another good shift soon afterwards. The compost suitable is formed of equal parts of loam, peat, and leaf soil with a little sand.

Pot firmly. Arrange the plants near the glass, as only sturdy, well-matured shoots flower satisfactorily. They should also have a light position during the flowering period, and a temperature of 55° to 65°. After the soil has become well occupied with roots, water must be supplied freely, and liquid manure occasionally. Young

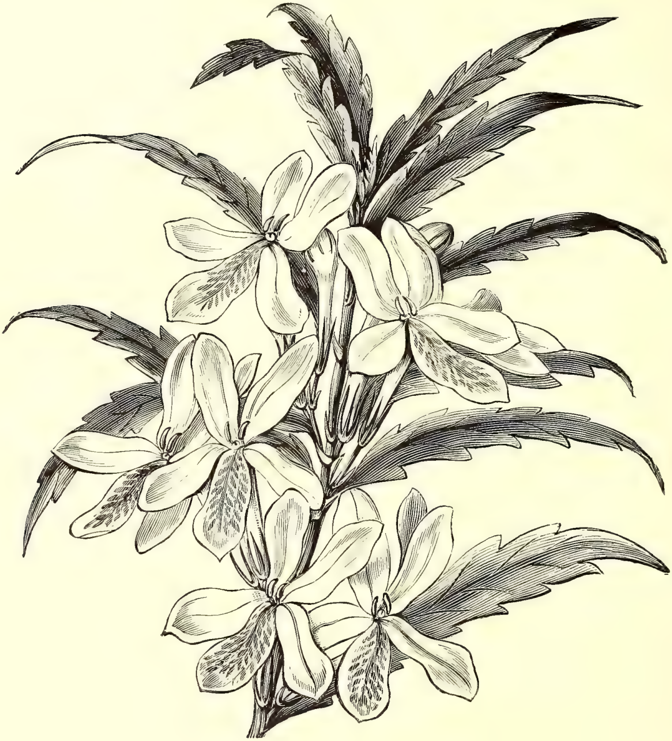

Fig. 151. Eranthemum Cooperi.

plants give the best results, but if large specimens are desired, cut back the old plants after flowering, and start them into active growth in the spring. When fresh growths are forming turn the plants out of the pots, freely reduce the old ball of soil and roots, and return to pots the same size they were in previously. Thin out the young shoots and allow those reserved ample room to develop. In all other respects treat similarly to the young plants. Brown scale and mealy bug are the principal enemies of Eranthemums, and the plants must be kept free of them by means of sponging with soapy water.

ERYTHRINA.—E. indica is the only species recommended for stove culture. It is a native of the East Indies: stems, hard and prickly; foliage, elegant; flowers, bright scarlet. Of this there is a white flowered variety; another (E. i. marmorata) has leaves blotched and spotted with white, while E. i. Parcelli, from the South Sea Islands, is still more beautiful, the leaves being prettily feathered with yellow. This species and its varieties are propagated in the spring by cuttings of young shoots taken with a heel, and inserted in sandy peat in a temperature of 75°, not confining them too closely. When rooted pot singly, and from small sizes gradually shift into larger pots, using a compost of equal parts loam, peat, and decayed manure with a sprinkling of sand. The plants ought to have a sunny position in an ordinary plant stove, gradually withholding water in the autumn to produce rest. Prune lightly a few days before watering, start the plants in genial heat in the spring, and re-pot or top-dress with rich compost before they have made much growth.

EUCHARIS.

"Amazonian Lilies," as Eucharises are sometimes termed, belong to the Amaryllis family and are established favourites with the flower-loving public. Well-flowered plants are highly attractive and equally suitable for house decoration or exhibition, while the flowers in a cut state are of considerable value, especially for making into wreaths, crosses, and other devices. A great point in favour of the plants is that two or three crops of flowers are frequently obtained from the same pots of bulbs in one year. There is one great drawback to their culture—the extreme liability of the bulbs to be infested by the Eucharis mite, a small pest that has ruined innumerable plants in this country. The knowledge that so many persons have failed to keep their Eucharises in good health has the effect of adding a zest to their culture by gardeners, and the majority succeed in their object.

The species long known as Eucharis amazonica, is now termed E. grandiflora, and is generally cultivated. It forms long, broad, somewhat succulent green leaves, and egg-shaped bulbs, with a rather long neck. The flowers are large, or from 4 to 5 inches across, pure white, drooping, and from four to six are borne on erect scapes about 2 feet long. E. candida, also from New Grenada, has broadly elliptic bulbs with a solitary leaf to each. The flowers are about 3 inches across, pure white, with prominent coronas. E. Sanderiana, New Grenada, resembles E. grandiflora in habit and foliage, but the flowers are smaller and differ in colour. They are pure white, with the filaments and inside of the tube yellow; corona suppressed and the umbels are from three to seven flowered, on erect scapes 18 inches long. E. Stevensi (Fig. 152) is one of the finest. It possesses the bold characteristics of E. grandiflora, is very floriferous, and said to be less subject to visitations from the mite. It was raised by Mr. Stevens, gardener to W. Thompson, Esq., Walton Grange, Stone, Staffordshire, and has been honoured by the Royal Horticultural Society.

Eucharises can be raised from seed, sowing as soon as ripe, or in February, in pans of sandy soil, in a temperature of 80°, covering with a square of glass and keeping moist and well shaded till the plants appear. Transfer the seedlings to pans of sandy, peaty soil, and before they become crowded place them singly in small pots. Plunge these, or arrange them on moisture-holding material, in brisk heat and a moist atmosphere, carefully shading from strong sunshine. When the small pots are becoming well filled with roots shift the plants into larger sizes, and do not dry them off at the roots. It is usually three years or more before the bulbs arrive at a flowering size.

The usual method of increase is by division of the bulbs any time during the spring. Old bulbs form offsets freely, and these are detached, each with a few roots, and placed singly in 3-inch pots. Treat as advised in the case of seedlings, and they will then develop into strong flowering plants. The pots ought in all cases to be well drained, and the soil used should consist of two parts of good fibrous loam (broken up coarsely for the larger pots), one part each of leaf soil and peat, with sand and charcoal to keep the compost open. If the loam is void of fibre or liable to turn sour, add a sprinkling of charred earth. Decayed manure is not recommended. What feeding is required is best given in the form of clear liquid manure, notably soot-water.

It is a mistake to be constantly potting and re-potting Eucharises. A group of bulbs strongly established in 9-inch to 12-inch pots may remain undisturbed for several years, flowering satisfactorily twice and sometimes thrice in a season. If kept too long in this state they will burst the pots containing the bulbs. These large crowded groups do not move well into larger pots, and the better plan is to pull them in pieces, grade the bulbs and re-pot, arranging six of the largest in 9-inch or 10-inch pots, sinking them in the soil to nearly their full depth, and the same number of medium-sized bulbs in 7-inch pots, the smaller divisions going into small pots. This may be done any time from February to June inclusive. The leaves should be cut off close to the bulbs, thereby getting rid of mealy bug and thrips, and preserving the sap stored in the bulbs for the formation of roots before leaves are developed. When the bulbs have to support the leaves almost unaided by the roots, the latter frequently fail to make good progress, and unless the watering is of the most careful description the soil is apt to become sour, the old roots perish, and the bulbs become loose, while the blame is attributed to an attack of mite. Shaking strong bulbs clear of soil, and re-potting, frequently causes

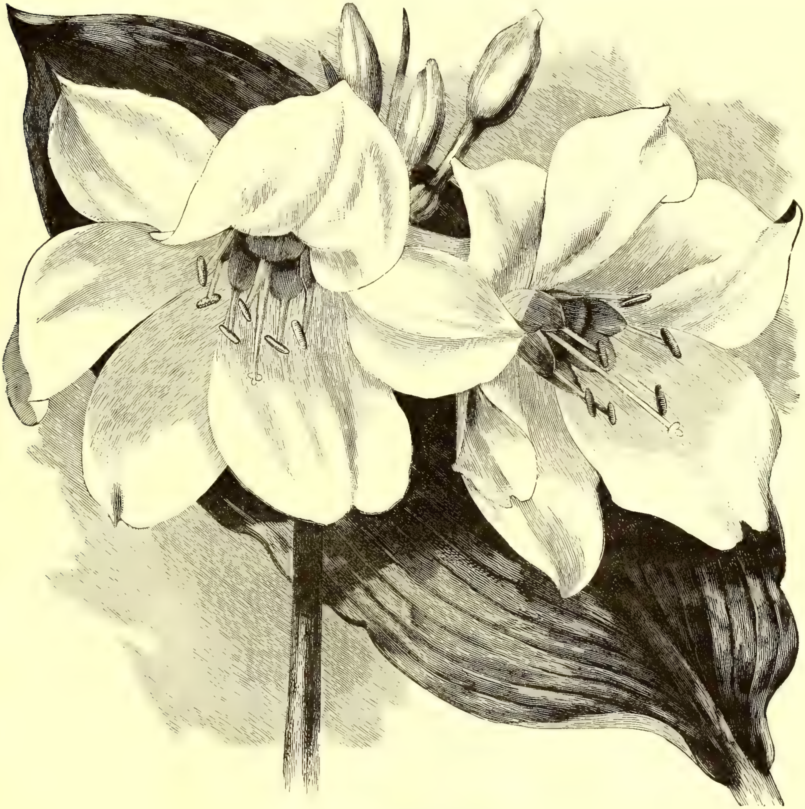

Fig. 152. Eucharis Stevensi.

them to push up their flower scapes soon after. Pinch them out as soon as seen, unless flowers are particularly wanted or the cultivator can afford to run risks, as this untimely flowering seriously checks root action.

A moist hot-bed is of great service in promoting root growth, but after the soil is well occupied by roots, the plants are safest and best arranged on a bed of ashes, with hot-water pipes beneath; if plunged in decaying hot-bed material, the plants are liable to be over-watered, and worms too are troublesome, souring the soil. Eucharises ought not to be mixed among a variety of other plants, not only because they like plenty of room, but also because insect pests quickly mar the foliage. Dry surroundings are injurious, and the syringe should be frequently employed in moistening the pots and staging; also in spraying the leaves. Nor ought bright sunshine to reach the leaves after the middle of March. Eucharises succeed admirably under a roof, thinly covered with stephanotis, with a blind over the glass on hot days. They seem to have a predilection for certain sites, and when once these are found it is well not to move them elsewhere for any great length of time.

A check to their growth, caused by moving healthy plants into a lower temperature, or an intermediate house, and withholding water from the roots for a month or so, followed by a sudden change to greater heat and moisture, will cause the bulbs to push up flower scapes quickly, but this may also prove injurious to the bulbs. After the young leaves have reached their full size, rather less water should be given, and the temperature of the house lowered about 5°, if this can be done. After three weeks of this comparative rest, a sudden increase of the temperature from 5° to 10°, accompanied by more atmospheric moisture and a soaking of water at the roots, will usually cause all strongly rooted bulbs to flower, and no risks are run. There should be no rest or partial rest given until the young leaves are fully developed. Eucharises also succeed when planted in a bed of well-prepared soil.

Their worst enemies are the mite already alluded to and mealy bug. The former minute pest multiplies quickly, preys on the bulbs and roots, soon paralysing their action, the bulbs eventually becoming loose, while the foliage changes to a sickly yellow hue. Bulbs in this condition are very difficult to restore to a healthy state, and most growers prefer to throw them away, and to start with a fresh, clean stock. The experiment of harvesting infected bulbs on a dry shelf, and after soaking them either in a dilution of lemon oil or other insecticide, potting in the usual way and starting them into growth is worthy of a trial. Preventive remedies are, however, more to the purpose. These have been largely foreshadowed, and may be briefly summed up as follows :—Avoid over-potting and, in particular, be careful not to make the soil sour by over-watering. Assist strongly rooted plants with frequent applications of clear soot water. When the right position is found for the plants, keep them there, and do not resort to the practice of transferring to cooler quarters and drying off at the roots. Shade carefully. If mealy bug be allowed to get the upper hand, this has a weakening effect and naturally favours an attack of mite. The foliage is most susceptible of injury from insecticides, especially if petroleum is used in any form. Sponge the leaves with a solution of soft soap only, and insects of all kinds may be subdued.

EUPHORBIA.

Of this large genus only three species are generally cultivated for the beauty of their flowers, or rather their coloured bracts, but collectors of succulents find others to admire for their fleshy stemmed character and grotesque form. Reference will be made to these subsequently, also to the popular and brilliant E. pulcherrima, under its better known name of Poinsettia. E. fulgens and E. splendens are the other two florally decorative species referred to.

E. fulgens (syn. E. jacquiniæflora), native of Mexico, is a beautiful stove species. During the winter well-grown plants produce long wreaths of orange-scarlet bracts, fringed by bright green lanceolate leaves, which retain their beauty for months. It is increased by cuttings of young shoots in May, or as early in the year as they can be obtained. Young plants give the best results, and therefore a fresh stock should be raised every season, whether the old plants are thrown away afterwards or not.

With a view to having abundance of cuttings, rest the old plants after flowering, then lightly prune and start them into growth in brisk moist heat. When the shoots are 3 inches long take them off with a heel, and insert three or four in firm sandy soil around the sides of 2½-inch pots. Plunge the pots in brisk bottom heat, or arrange in a close propagating frame with a temperature of 70° to 80°. Avoid over-watering. When well rooted assign the plants a light position on a shelf or stage for a few days, then shift them, intact, into 5-inch or 6-inch pots, disturbing the roots as little as possible. Good drainage must be afforded, and a compost of fibrous loam and peat in equal parts, with a liberal addition of sharp sand and finely broken pot-sherds mixed in the soil. Pot somewhat firmly, and keep the plants growing in a light position in brisk heat all through the season. The three plants lightly supported with stakes will each develop a single long growth, which should sparkle with small brilliant flowers in the winter. This is better than topping and having several weakly shoots. Strong plants in 6-inch pots may, when about 12 inches long, be given a sharp curve, this causing each stem to push two or three long growths; these, as well as the curved portion or original leader, if well matured in the full sun, flowering in due course. At no time ought the plants to be exposed to currents of cold air or low temperatures, a check of this description causing them to shed their leaves.

If the plants have been transferred to an intermediate temperature while in flower for keeping them attractive as long as possible, return them to an ordinary stove temperature and rest them for about three months, giving only sufficient water to keep the wood plump. Prune and start into active growth as already advised. A sufficient number of cuttings having been obtained, the old plants may be re-potted, after carefully picking a portion of the old soil from the roots. A small shift suffices. Subsequent treatment is similar to that of young plants, allowing the heads of growth to develop naturally and strongly. This Euphorbia succeeds admirably planted out in stoves either thinly, in a bed, or singly against back walls, pillars or other uprights. A great mass of soil is not needed. After flowering reduce the water supply, and freely shorten the branches prior to starting the plants into active growth in the spring. (See index for coloured plate.)

E. splendens, a Bourbon species, is totally different from the foregoing, and less useful. It is of branching habit, stems woody, closely furnished with sharp thorns, and sparsely covered with small bright green leaves. The "flowers" bright red, waxy, and produced in small trusses, almost constantly. Short side-growths, inserted singly in small pots of sandy soil and placed in dry heat, emit roots freely. From small pots shift into larger sizes, as more root room is required. The growths are lightly trained round stakes, or over a trellis, and neither topping nor pruning is desirable. Arrange the plants in a sunny position, give water freely during the hottest part of the year, and somewhat sparingly during the winter.

EXACUM MACRANTHUM.—Belonging to the gentian family, and a native of Ceylon; this is one of the most beautiful of all stove plants, because of its lustrous indigo-blue flowers, with rich yellow stamens. The individual blooms, of which several are borne on a terminal corymb, are about 2 inches in diameter, the corolla being divided into five ovate, slightly recurving segments, terminating in a rather sharp point. The leaves are bright green and slightly ribbed, those on the upper part of the stem, sometimes

3 inches long and an inch wide, tapering at both ends. The plant attains a height of 15 to 18 inches, and is of comparatively easy culture. It is raised from cuttings which root freely at almost any period of the year in light sandy soil and brisk moist heat. The plants grow well in sound loam and leaf soil, with a light dusting of soot intermixed, and sand to secure porosity. The pots are better stood on a close damp stage than on an open lattice trellising over hot-water pipes. The plants enjoy a light position, and it is advisable to syringe them and keep the roots moist to prevent attacks of red spider. This Exacum is a heat-loving plant and will not long remain healthy in a winter temperature below 60°, summer 70° to 85°. (See Index for coloured plate.)

FICUS.—F. elastica and its variegated form (Fig. 154) are extensively grown for sale, and will be treated under Commercial Floriculture. F. Parcelli, Polynesia, is grown in plant stoves for the beauty of its variegated leaves. It is propagated in the spring by cuttings of young shoots inserted in sandy soil in a temperature of 65° to 75°. The plants thrive in a rather firm compost of three parts loam to one each of peat and leaf soil, with a little sand. A somewhat shady position is desirable. Give water freely during the hottest part of the year and in moderation at other times. What pruning is necessary may be done in February, re-potting the plants just when fresh growth is forming. F. stipulata (syn. F. repens), Japan, is found clinging (ivy-like) to numerous stove, greenhouse, and conservatory walls. It forms small, roundish, dark green leaves, varying in size according to circumstances; easily propagated from cuttings, and may be planted in ordinary soil.

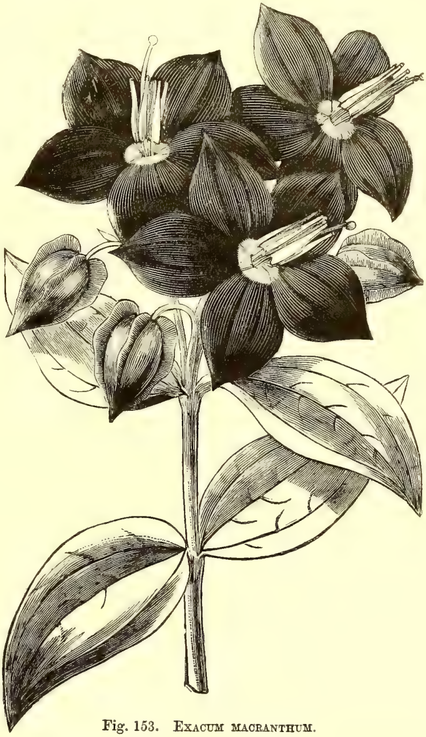

Fig. 153. Exacum macranthum.

Abundance of water should be supplied to the roots, and a moist shady wall is favourable to strong growth. The small-leaved form, F. r. minimus, is particularly suitable for covering the back walls of plant stoves.

FITTONIA ARGYRONEURA.—(Syn. Gynostachyum Verschaffelti). This plant is dwarf and compact, with large, broad, vivid green leaves, traversed by a network of pure white veins. F. Pearcei, is a good companion, having light green leaves, the mid-rib and veins bright carmine. Both are effective either in small pots or massed in pans, and are also well-adapted for mixing with Lycopodiums and other plants in troughs and disposed so as to drape the fronts of stages in plant stoves. Cuttings of firm shoots inserted in sandy soil root freely in a close frame and a temperature of 75° to 85°. Old plants can also be divided in February or March. Pans may be "made up" with several plants. Drain well and employ a compost of equal parts fibrous loam and peat with sharp sand. They form a beautiful undergrowth to large plants stood on beds, delighting in heat, moisture and shade.

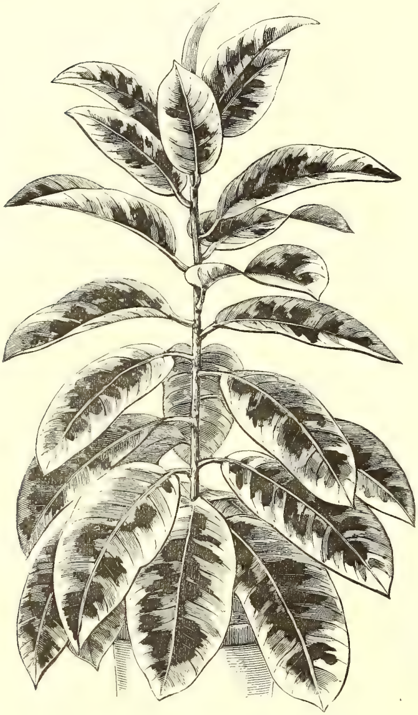

Fig. 154. FICUS ELASTICA VARIEGATA.

FRANCISCEA OR BRUNFELSIA.—Evergreen shrubs of a slow-branching habit, distinctly attractive when in flower, and interesting by the change of colours, from blue almost to white. F. acuminata, Rio Janeiro, height 1 to 2 feet, has somewhat attenuated leaves, and produces bluish violet flowers rather sparingly in the summer. F. calycina, Brazil, height 2 to 4 feet, has large shining green leaves, and purple flowers in trusses, but almost continuously. F. c. major, a variety of the preceding, is the finest Franciscea in cultivation. These and other species can be obtained from nurseries. Franciseeas may be propagated by inserting cuttings 2 to 3 inches long, from February onwards, in pure sand, under a bell-glass in a temperature of 60° to 70°. When rooted place them singly in small pots, using sandy peat soil. Keep the plants growing in moist heat, and gradually shift them into larger sizes. Top to make them branch. When they have attained to a flowering size, harden the wood by exposure to the sun in a drier atmosphere and cooler night temperature, this causing them to form flower buds. What little pruning is necessary to keep the plants shapely should be done after flowering; this is also the period for re-potting, should this be needed, in a compost four parts each of coarse fibrous peat and leaf soil, one part fibrous loam with a little sharp sand and a sprinkling of fine charcoal. Pot firmly. Syringe the plants freely from March to August, and at no time ought they to become dust dry at the roots. Mealy bug and thrips are their worst enemies, and must be kept under. (See Index for coloured plate.)

GARDENIA.

Gardenias or Cape Jasmines are remarkable alike for the purity of their flowers and their powerful yet pleasing fragrance. Given the right treatment they can be had in flower during the greater portion of the year, and where there is a demand for choice flowers suitable for buttonholes, bouquets and glasses, gardenias ought to be grown according to the requirements. G. citriodora is of a dwarf, stocky habit, and during the early part of the year affords a profusion of small, white, citron-scented flowers, which in a bud-state may be used as a substitute for orange blossom. G. florida (the double form) is of a free-branching habit of growth, both flowers and foliage being of medium size. It is perhaps the most continuous blooming of all, and the easiest to cultivate. G. f. Fortunei is stronger and less bushy than the preceding, while the blooms are larger and fewer in number. G. f. intermedia (Fig. 155) is intermediate between the two, and a most desirable variety. G. radicans and the larger form of it G. r. major, succeed in a lower temperature than the others; habit compact, flowers of medium size and strongly scented. G. Stanleyana (Randia maculata) produces long-tubed flowers from the axils of the leaves, whereas the true gardenias are terminal flowering. It succeeds under the same treatment.

All Gardenias may be easily propagated by cuttings of side shoots 2 to 3 inches long, inserted either singly in small pots or thinly round the sides of larger, fixing them firmly in sandy peat. Plunge the pots in brisk hot-bed, in a frame or cover with a bell-glass in a temperature of 75° to 85°. The first young plants must be grown as strongly as possible. The front stage of a plant stove or forcing house, on which they are arranged, ought to be covered with ashes or other moisture-holding material, kept constantly damp. The plants must never become very dry at the roots, nor in the earlier stages of growth ought shifting into larger pots be deferred till they become seriously root-bound. Top the young plants once to make them branch, then allow them to develop naturally. From 2½-inch pots, transfer to 5-inch, a size in which the later-struck plants may be flowered, giving another shift to the more advanced. Suitable soil consists of equal parts loam and peat with a little crumbled manure and sand. Over-potting is a too common mistake. If the soil gets soured before the roots have a chance to occupy it little further growth will be made, the foliage changing from a bright green to a sickly yellow hue, and then the plants are not worth house-room. At the same time

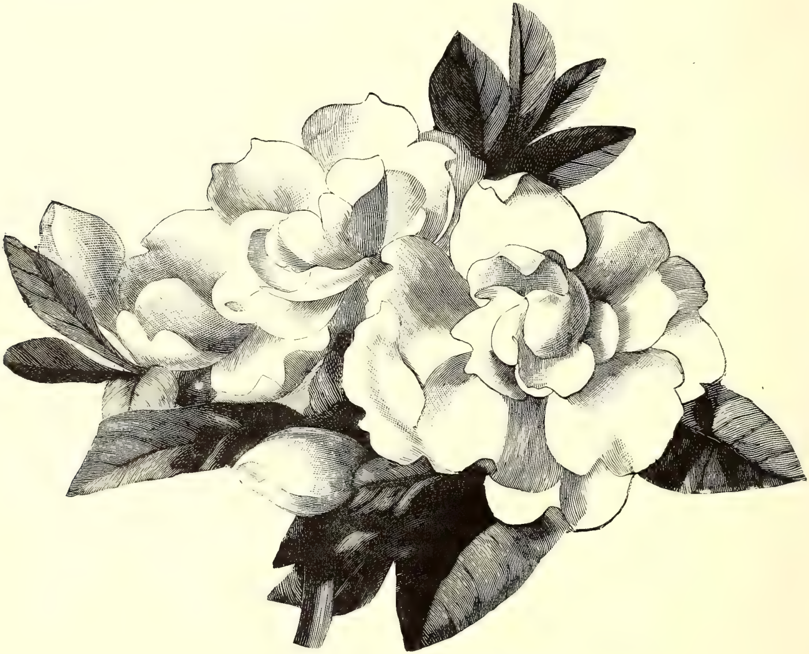

Fig. 155. Gardenia florida intermedia.

it must be borne in mind that large plants strongly rooted in comparatively small pots require, and must have, abundance of water and liquid manure both before and during the flowering periods. Shade from strong sunshine and syringe the foliage in the mornings of, and again when the houses are closed on, bright days. All through the growing season, high temperatures (75° to 85°) should prevail; but during the winter months, when the plants are resting, 60° to 65° suffice. Bushy plants 2 feet and upwards in height may be grown in one season, and these give better results than do plants three or four years old. Those who prefer to keep their old plants should prune them moderately in the spring directly after they have expanded the first blooms. When fresh growth commences, reduce the soil and roots somewhat, and transfer to pots a size larger than they were in before, afterwards treating as advised for one-year-old plants.

Gardenias are sometimes planted in beds of soil over bottom-heat pipes with good results. The start should be made with young plants, as these soon root into the soil, whereas large plants not unfrequently fail to produce roots freely, and therefore cannot flourish. If head-room is limited, train the growths so as to form a level hedge-like surface. When they give signs of failing, clear out both the plants and soil and start afresh in preference to trying to restore the lost health of the old plants.

Mealy bug is the greatest enemy Gardenia growers have to contend with, and if this pest cannot be kept under, it is useless to keep the plants. The methods of getting rid of mealy bug, and also brown scale, another troublesome insect, are fully described on page 263.

GESNERA AND NÆGELIA.

The dividing line between these two sections of the Gesnera family is so very fine that, for all practical purposes, they may well be included under one heading. The plants are easily grown, and several of the species and varieties decidedly beautiful, both in foliage and flowers, and might with advantage be more extensively cultivated. With judicious selection, a good display can be made in warm greenhouses in the summer and in stoves during the autumn and winter months.

Gesnera or Nægelia cinnabarina, Mexico, attains a height of 2 feet, forms large broad leaves, green, beautifully shaded with flame-coloured hairs; flowers scarlet with a light throat, borne on long spikes in winter. G. Donckelaariana, Columbia, height 1 to 2 feet, leaves 8 inches across, green, tinged with purple and red; flowers bright vermilion in terminal heads in summer. G. pyramidalis, Garden Hybrid; handsome velvety leaves; flowers deep orange; red throat, and lip prettily spotted with light orange. G. refulgens, one of the most popular; height 1 to 2 feet, leaves large, clothed with short blood-red hairs; flowers rich deep red. G. (Nægelia) zebrina splendens, Brazil; height 2 feet; large, handsome, dark, marbled leaves; flowers bright orange in long panicles in winter. Other good species and varieties are Gesneras—macrantha, macrantha magnifica, and splendens, with Nægelias—Chardin, Fabiola, General Dodds, Jeannette and Sapho.

Gesneras and Nægelias may be raised from seeds sown during March or April on the surface of well-drained pots or pans of sandy peat previously moistened in a temperature of 75°, covering with glass, and shading heavily till germination takes place. Transfer the seedlings, when large enough, to pans of sandy peat, and grow them in heat till they are ready for placing singly in pots. Cuttings of young shoots inserted in pots of sandy peat in a temperature of 75° to 80° in the spring, emit roots and develop into flowering plants the same season. Well-matured leaves, if pegged down on the surface of pans of sandy peat as advised for Begonia Rex (page 291), will also result in the production of numerous small plantlets.

All the plants form either scaly tubers or catkin-like stolons, and by these are increased at potting time. After the plants have completed their growth gradually withhold water, and as soon as the stems die down, cease watering, storing the pots on their sides in an ordinary stove temperature till the time arrives for starting the tubers into active growth. Those to flower in the summer should be potted in March, others following one or two months later for flowering in the autumn and winter. The strongest of the tubers may be placed singly in 5-inch pots, and three or five of the smaller ones in 6-inch pots, in which sizes the plants may be flowered. Pot in a mixture of two parts fibrous loam, one each of peat and leaf soil, adding a little well-decayed manure and sand. Drain the pots thoroughly, press in the soil rather firmly, and bury the tubers about an inch deep.

The best positions are light, moist stages in an ordinary plant stove, where they can be shaded from strong sunshine. Very little water should be given till top and root growth is well advanced, but when the soil is fully occupied by fibrous roots abundance of water and liquid manure ought to be applied. Arrange the plants clear of each other, so as to allow room for the foliage to develop, and be careful not to disfigure the foliage by syringing. Even clear water stains the leaves. Gesneras thrive in moist surroundings. By potting tubers of G. cinnabarina early in June, partially plunging the pots in damp ashes in frames, kept close and shaded from hot sun, and removing the plants to warmer quarters—a stove—in September we have had glowing pyramids of beauty throughout December and January—more effective by far than any other flower at that usually dull period of the year.

GLOBBA.—G. astrosanguinea, Malayan Archipelago, is a stove herbaceous plant worthy of inclusion in large collections. The plants form numerous fine stems, which produce terminal racemes of yellow flowers, with scarlet bracts, during the greater part of the year; increased by division of the roots in the spring. Pot in a mixture of loam, peat, leaf soil and sand, and grow the plants in a warm, moist position.

GLORIOSA.—Few stove flowering plants are more effective than G. superba. It is a native of Tropical Asia and Africa, and may be briefly described as a tuberous-rooted deciduous stove-climber. Well-grown plants attain a length of 6 feet or more, and at the ends of the growths produce numerous large, quaintly-formed, orange-red flowers in the summer. A stock of plants may be raised from seeds, and further increased by off-sets. The young roots are very brittle, and the less they are disturbed the better. The seed should, therefore, be sown singly in 2½-inch pots of light sandy soil, and plunged in a gentle hot-bed. Remove off-sets from the old tubers prior to starting these in the spring by placing them singly in small pots. Neither seedlings nor off-sets will become strong enough to flower the first season, but will form small tubers for growing into flowering plants the following summer. When the tops are beginning to die down, gradually lessen the supply of water, eventually keeping the soil quite dry, for resting the tubers, and the pots on their sides in a dry position in stove during the winter. In February carefully remove the old soil, and re-pot in a rather coarse mixture of equal parts loam, peat, and leaf soil, with a little decayed manure and silver sand. One medium-sized tuber suffices for a 6-inch, while three smaller may be placed in 8-inch pots. Good drainage is necessary, and the tubers may be covered 2 inches deep. Arrange the pots on a moist base along the front of a well-heated plant stove, and give very little water at first, applying it more freely when growth is well advanced. Train the shoots loosely up a roof trellis. A temperature of 70° to 85° suits Gloriosas during the growing and flowering season, and from 55° to 65° when the tubers are dried off.

GLOXINIAS.—See page 39, Vol. I.

GOLDFUSSIA (STROBILANTHES).—Of this well-known genus of stove plants only a single species, G. anisophylla, need be included in these pages. It comes from the East

Indies, and is a small sub-shrub attaining a height of 2 feet; flowers lavender colour, freely produced in June. Cuttings of moderately firm shoots, 2 to 3 inches long, inserted in light sandy soil in a propagating frame, or under a bell-glass, in a temperature of 75°, root freely in the spring. The plants should be arranged in a moist part of the stove during the early part of the year, and in a pit or frame from June to September. Old plants may be re-potted in March or April, in a compost of equal parts loam and leaf soil, with a little sand.

GRAPTOPHYLLUM.—G. hortense, syn. G. Nortoni, known as the Caricature Plant, is of garden origin, and worthy of culture for the beauty of its leaves. It is propagated in March or April by cuttings of firm young shoots, 2 to 3 inches long, taken with a heel and inserted in all sand, under a bell-glass, in a temperature of 65° to 75°. Pot in equal parts peat and loam, with a free admixture of sand; grow the plants in a moist stove, prune into shape in February, and re-pot soon afterwards.

GYMNOSTACHYUM.—See FITTONIA.

HÆMANTHUS.—These showy bulbous-rooted plants deserve attention at the hands of owners of plant stoves. They are not difficult to grow, and when in good condition never fail to attract admiration when in flower. H. cinnabarinus, West Africa, has from twenty to forty red flowers, in an umbel, borne on a scape 1 foot long; April. H. hirsutus, Transvaal Republic, has pure white flowers, in dense heads 4 inches in diameter. H. insignis, Natal; the flowers of this warm greenhouse species are bright orange scarlet; July. H. Kalbreyeri, Guinea, is one of the best of the group; the flowers are bright crimson, borne in a head 8 inches in diameter. H. Lindeni (Fig. 156), from the Congo region, is less known, but distinct and beautiful, as the rosy red flowers are less crowded than in most other species. H. Katherinæ, deep red, and H. puniceus, orange scarlet, are also worthy of inclusion in a select list. The plants are increased by off-sets removed when potting-time, placing these singly in small pots, and keeping them in close quarters till well-established. They should be grown as rapidly as possible, only strong, well-rooted bulbs flowering satisfactorily. The soil recommended is two parts of sandy loam, one part peat, with a little well-decayed manure and sand. Strong bulbs should not be re-potted oftener than every third season, the early-flowering species from August to November, and the late-flowering species in March or April. Sink the bulbs half their depth in the soil. During the resting period very little water should be given, but after growth has well commenced, supply it copiously, with liquid manure for plants in a root-bound state. Each species after

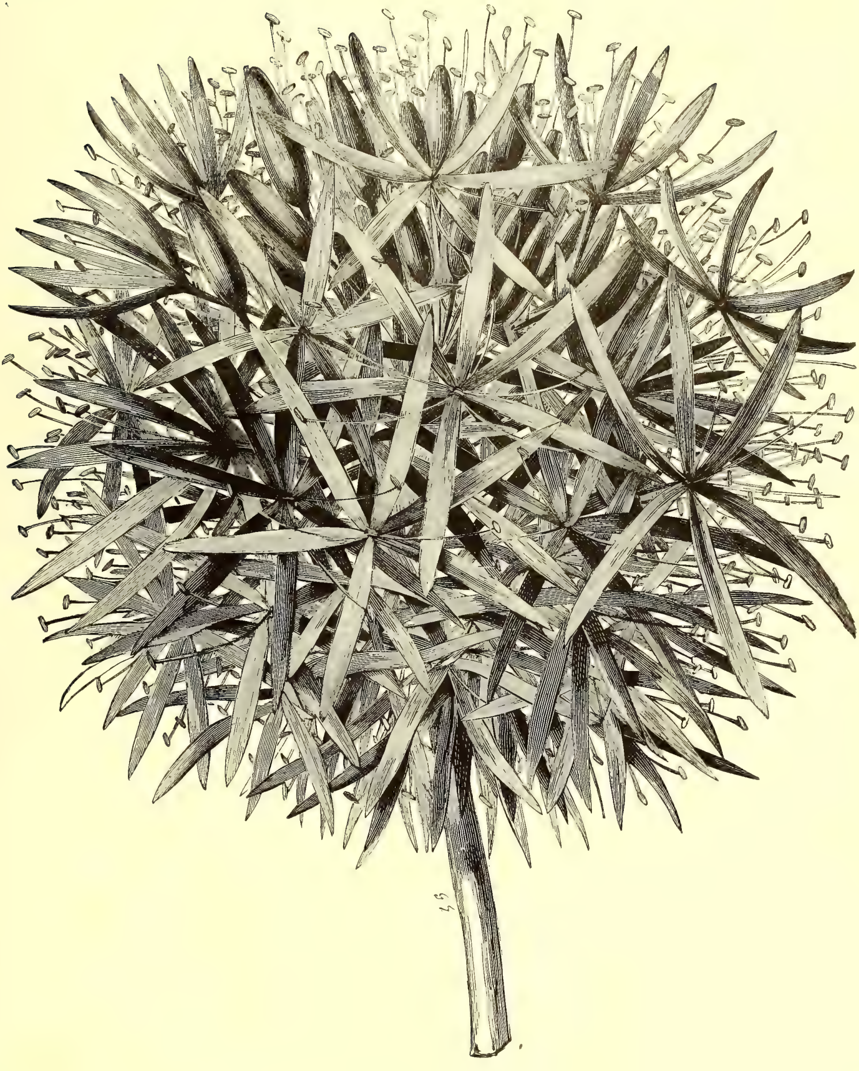

Fig. 156. Hæmanthus Lindeni.

flowering should be kept growing in gentle heat for a few weeks, and when the growth is matured the resting period may commence.

HELICONIA.—These Canna-like plants from the tropical regions of the Western hemisphere are not often met with in private collections; they are principally grown for the ornamental character of their leaves, and are increased by division of the roots in March or April. Pot in a mixture of two parts fibrous loam, one part each of peat and leaf soil, and a sprinkling of sand. A shady position in a plant stove suits them.

HETEREOCENTRON (HEERIA).—H. rosea is a somewhat rare flowering sub-shrub. It is of a dwarf branching habit of growth, producing many rose-coloured flowers during the autumn and early winter months. Cuttings of young shoots inserted in sandy soil in gentle heat, during February or March, root freely. Pot in equal parts of sandy loam and peat. Ordinary stove treatment.

HIBISCUS.—The heat-loving Hibiscuses, which have sprung mainly from H. rosa-sinensis, a species from China and Japan, are cultivated mostly for the beauty of their flowers, double as well as single. H. r. Cooperi, an old favourite, fast going out of cultivation, is of a branching habit of growth, and has prettily variegated leaves. Among those grown for the beauty of their flowers are brilliantissima, Collieri, cruenta, Dennisoni flore pleno, Lucien Linden, and Van Houttei. This class of Hibiscus can be raised from seed, and also increased by cuttings. Sow the seeds in March in pans or pots of sandy peat, in a temperature of 75°, cover with glass, and shade heavily. When the seedlings are large enough to handle, place them singly in 2-inch pots, and grow them in moist gentle heat. Top to make them branch, and gradually shift into larger sizes, using a mixture of equal parts fibrous loam and peat, with the addition of charcoal and sand. Cuttings of firm shoots may be inserted in sandy peat, in a propagating frame or under a bell-glass, in brisk heat in March and April. When rooted, treat as advised in the case of seedlings. Rest the plants during the winter, by keeping them somewhat dry at the roots. In February or March, prune lightly and start into active growth, soon afterwards re-potting. These Hibiscuses are strong-rooting plants, and must have abundance of water and liquid manure.

HIPPEASTRUMS.—See AMARYLLIS (page 289, Vol. I.).

HOYA.—Reference has already been made to H. carnosa, which succeeds well in greenhouses. H. bella, a popular species from India, is altogether different in its habit of growth, and produces a long succession of charming many-flowered umbels of waxy white flowers, with rosy crimson centres, H. b. Paxtoni differing in having white flowers with pink centres. The plants are of slender growth, and adapted either for hanging baskets or trailing over small trellises. Cuttings of firm shoots inserted in sandy peat, under glass, in a temperature of 75° to 85°, produce roots, but own-root plants never grow so vigorously as do those grafted low down on young plants of H. carnosa. H. bella and its variety succeed best in comparatively small pots and a mixture of three parts good peat to one of loam, with a little crushed charcoal, lime rubbish, and sand. Top the young plants to make them branch. Assign well-established plants in a sunny position, and be careful not to over-water, especially during the winter. As H. carnosa succeeds in cool stoves, a characteristic illustration is given (Fig. 157) in which drops of nectar are seen hanging on the flowers.

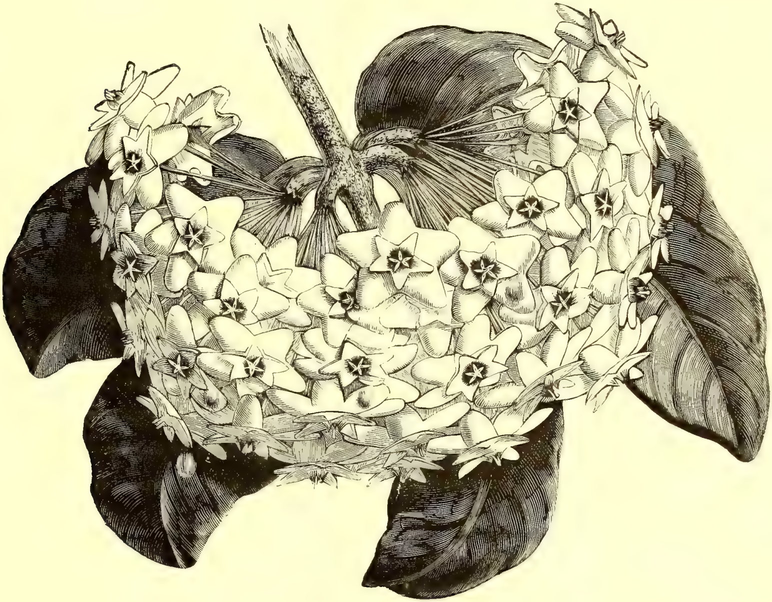

Fig. 157. Hoya carnosa.

HYMENOCALLIS.—This genus is closely allied to Pancratium, and only one species will be described as being sufficiently distinct or valuable to merit the distinction.

H. macrostephana produces white flowers with a green tube, in umbels, six to ten on stoutish scapes, these retaining their freshness and fragrance longer than those of any other species in cultivation; spring. For cultural details see PANCRATIUM.

IMANTOPHYLLUM (Clivia) are sometimes grown in stoves, but succeed equally or better under cooler treatment. See "CONSERVATORY."

IMPATIENS.—Several species of Impatiens (Balsam) are catalogued as suitable for stove culture, but none is so popular as I. Sultani was for a time. This very showy species was introduced accidentally, coming in the soil with other kinds of plants to the Royal Gardens, Kew, from Zanzibar. It is an erect-growing, branching, rather succulent, stove perennial herb, producing flat-petalled, scarlet flowers very freely, and at all seasons. I. flaccida alba is a fairly good white-flowering companion for it, while I. Hawkeri (Fig. 158) grows stronger and is less floriferous; flowers crimson. These Impatiens can be raised from seed in rich light soil in March, in a temperature 65° to 75°. Place the seedlings first in small, then larger pots, and allow the plants to branch naturally. Cuttings of young shoots may be inserted singly in small pots whenever they can be

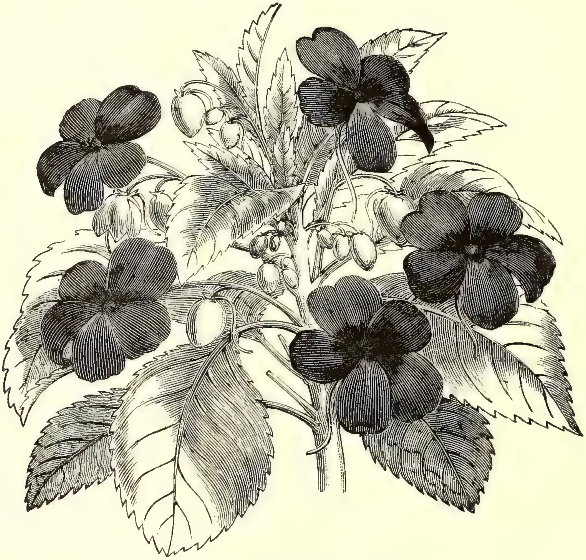

Fig. 158. IMPATIENS HAWKERI.

obtained, those rooted late in the summer and early autumn months frequently proving of service for house and table decoration. During the hottest part of the year pits and frames are the best positions for the plants. Syringe them on hot days, and keep the roots well supplied with water and weak liquid manure.

IPOMÆA.—Included among the "Bindweeds" are two beautiful evergreen stove twiners fully deserving of recognition at the hands of all private gardeners who have conveniences for their culture. I. Horsfalliæ, West Indies, produces cymes of deep glossy rose-coloured flowers all through the winter. I. Leari, Ceylon, a vigorous species, gives flowers of an intense blue colour from July to October. The first-named is somewhat difficult to propagate from cuttings, but may be either layered or grafted on the more robust I. Leari. Cuttings of this species, formed of side-shoots, may be inserted in sandy peat, under bell-glass, in a temperature of 75° to 85°, from March to August. First establish the young plants in small pots, and then gradually shift them into larger sizes, employing a mixture of two parts fibrous loam to one each of leaf soil and decayed manure, with a little sand. They must be kept well supplied with water, and when the pots are becoming crowded with roots apply liquid manure frequently. Train the young plants round stakes at first, and, when large enough, arrange them where they can cover pillars or arches, or wherever they will show to the best advantage. In February prune the growths somewhat closely, and re-pot in March. Some of the annual species are suitable for stove culture by sowing in heat in March, about three seeds in each 3-inch pot, not dividing the plants afterwards, but shifting direct into larger pots. They succeed best either in boxes or planted out in borders of rich light soil.

JACARANDA.—J. mimosifolia, an acacia-like species from Brazil, is cultivated in plant stoves both for the elegance of its leaves and the beauty of its panicles of blue flowers produced by strong plants only. Plants may be raised from seeds in light sandy peat any time from February to June, in a temperature of 75° to 80°. Establish the seedlings in small pots in a light position, and give a timely shift into 5-inch pots, in which size neat single-stemmed plants may be grown for house or table decoration. A suitable compost is formed of equal parts peat and loam, with an addition of silver sand. Cuttings may be made of firm shoots any time during the summer, and inserted in sandy peat, under a bell-glass, in a temperature of 75°, shading carefully. Treat the plants thus raised similarly to seedlings. If Jacarandas are wanted to flower, grow them as tall standards.

JACOBINIA or **SERICOGRAPHIS.**—J. Ghiesbreghtiana, Mexico, is an acceptable winter-flowering cool stove plant of easy culture. It forms plain bright green leaves, and produces terminal panicles of scarlet flowers. Propagation is effected by inserting cuttings of young shoots from March to July, in small pots of sandy soil plunged in a close frame and a temperature of about 75°. Top the young plants at least twice to make them branch, and gradually shift into larger pots. They may be flowered in 6-inch to 8-inch pots, and succeed in a mixture of equal parts loam, peat, leaf-soil and sand. During the summer the plants may be arranged in sunny pits or frames, and should be returned to a light position and temperature of 55° to 65° to flower. When well established in their flowering pots, abundance of water varied by liquid manure should be given. After flowering, give rather less water for a fortnight, then cut down the growths to near where they last branched. When fresh shoots are beginning to form, shake the roots nearly free of soil, and after trimming them with a knife, re-pot in sizes just large enough to hold them. Give a shift when this is needed, and in other respects treat as advised in the case of young plants.

JASMINUM.—A few tropical species are cultivated in plant stoves, but are by no means commonly grown. Two or three flowers seem capable of perfuming a house, but, unfortunately, they fall quickly after they are cut. J. gracillimum, Northern Borneo, is a small-growing species, forming a neat bush, and produces panicles of white sweet-scented flowers in the winter. J. Sambac, India, white fragrant flowers, is more twining in habit; this and the double forms, Duchesse d'Orleans and flore pleno, succeeding best when trained against pillars, where they produce a few or many flowers nearly all the year round. Propagation is effected from March to September by cuttings of firm shoots inserted in sandy peat, and closely covered with glass, in a temperature of 65° to 75°. Pot in a mixture of equal parts of sandy loam and peat. J. gracillimum (Fig. 159) succeeds well in a hanging basket, in which case the plants should be freely topped to make them bushy. They thrive and flower in an ordinary stove temperature, and should not be allowed to become dry at any time. Assist root-bound plants with liquid manure. Prune away irregular growths in February, and soon after re-pot the plants.

JUSTICIA.—Justicias are frequently confused with Jacobinias and other kinds of plants, but it is the popular term for the species to be described, and is retained accordingly. J. aurea, also known as Cyrtanthera catalpæfolia, Honduras, forms broad leaves, and produces yellow flowers in July. J. carnea, Rio Janeiro, is of a sturdy habit of growth, and produces plume-like heads of flesh-coloured flowers in the autumn. An old favourite of gardens, J. flavicoma, is now termed Schaneria flavicoma; this again is sturdy in habit, also somewhat branching, its yellow flowers being produced in the winter. The J. speciosa of catalogues, another well-known old stove plant, is by scientific authorities classed as Peristrophe speciosa. It is of a compact, branching habit of growth, and gives abundance of carmine purple flowers during the winter. All are propagated and cultivated as advised on the preceding page for Jacobinia.

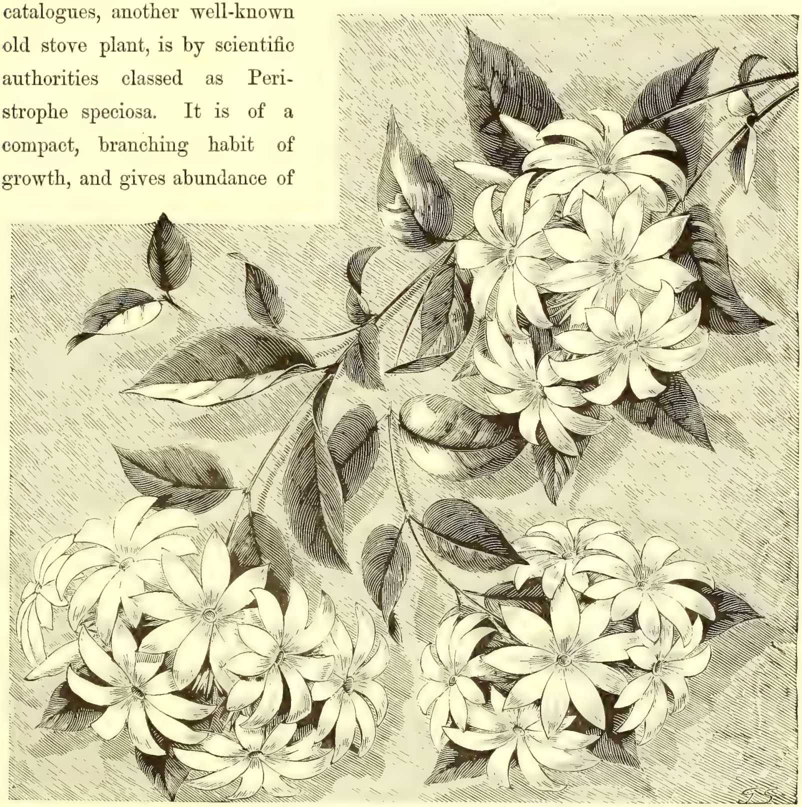

Fig. 159. Jasminum gracillimum.

LIMNOCHARIS.—L. Plumieri is the only species of this aquatic in cultivation. It is a native of Brazil, and may be grown in a warm greenhouse, conservatory or cool stove tank, or share an aquarium with other aquatics. The leaves are oblong and blunt at the ends, while the flowers are yellow, and borne six to ten in an umbel. June to November. Raised from seeds sown in soil under water in March, and increased by division of the plants in April. Plant 6 to 9 inches below the surface of water in a mixture of sandy loam, leaf soil and sand.

MANETTIA.—Among the various plants employed for furnishing pillars, rafters or trellises, in mixed plant stoves should be included Manettias. They are evergreens, of a shrubby climbing habit of growth, not difficult to cultivate, and produce bright tubular flowers during the greater part of the year. M. bicolor, Organ Mountains, flowers bright scarlet and yellow; M. cordifolia, Brazil, flowers scarlet; and M. micans, Peru, flowers rich orange, and yellow, are all recommended. Plants may be raised by sowing seeds, in February or March, in light sandy soil, placing the pans in a temperature of 55° to 65° for the seed to germinate. Cuttings of firm young shoots, 2 to 3 inches long, inserted in small pots of sandy soil, kept close in a temperature of 65° to 75°, with the pots plunged in brisk bottom heat, emit roots. Gradually shift the young plants from small pots to other of larger sizes, or plant in boxes or narrow beds of soil consisting of loam, peat, and leaf soil in equal parts, adding pounded charcoal and sand. Train the plants round stakes or pillars and they will then branch naturally. After flowering, prune lightly, simply removing unruly growths, which are not required for furnishing blank spaces. Re-potting may be done in February or March. High temperatures are not desirable. Give water freely during the growing and flowering season, reducing the supply while the plants are resting. Syringe daily all through the spring and summer months.

END OF VOL. II.

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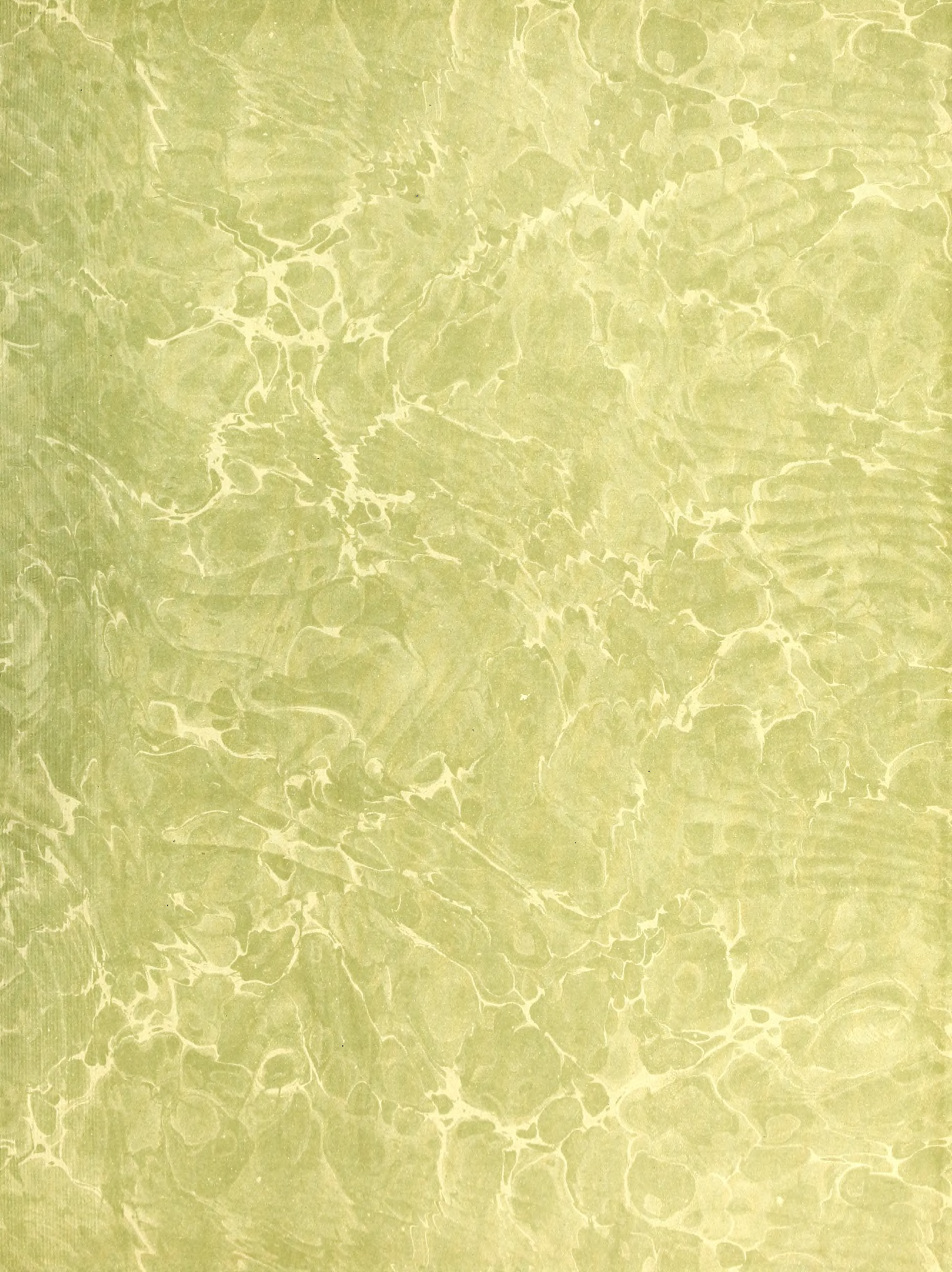

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